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W. C. EBAUGH

Permanent Secretary Denison Scientific Association



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# THE HESPERIOIDEA OF NORTH AMERICA

A. W. LINDSEY, E. L. BELL and R. C. WILLIAMS, JR.

The first edition of this work appeared in 1921 under the title *The Hesperioidea of America, North of Mexico,* in the University of Iowa Studies in Natural History, as number four of volume nine. It was published as a revision of the genera, which had previously been in a more or less chaotic state, but in order to increase the range of its usefulness a synopsis of all known species was included. This synopsis amounted to little more than keys to the species with a few comments on the more obscure forms and brief notes on distribution and seasonal occurrence, but the cordial reception of the paper by lovers of the Lepidoptera may be taken as a mark of its usefulness.

In undertaking a revision of this study we are influenced by several considerations, chiefly the additional information which has accumulated during the intervening decade.[1] Several new species have been described from the included area and several doubtful species have been clarified. Our knowledge of genera has also been modified in some particulars. These factors, together with the difficulty of securing older papers, lead us to believe that a new edition is justified.

[1] Since publishing the first edition of this paper my work in systematic entomology has gradually given way to more pressing duties and interests. I have at last found it advisable to give up my collection of Hesperioidea, but in doing so, I have decided to make this final contribution to the literature. In the past ten years Captain Roswell C. Williams, Jr., and Mr. E. L. Bell have been keenly interested in these insects and have done extensive and valuable work both on our fauna and on that of tropical America. Their work has appealed to me as so nearly complementary to my own that it is highly fitting that we should collaborate in this revision. Both have expressed their willingness to share in the work, and it is a pleasure to me to say that however closely we may follow the original in these pages, every step has been subjected to our joint scrutiny. Everything which we have set down here is a product of our agreement or of unanimous compromise with insufficient facts; our authorship is truly coöperative.—A. W. Lindsey.

It would be desirable in presenting this edition to include in it full descriptions of species, complete bibliography, and all of the known facts concerning life histories, but the bulk of such an extensive revision would be prohibitive. While completeness within the covers of a single work is greatly to be desired, we have found that even the scanty treatment of the group which was included in the original paper is adequate for the identification of species. We are therefore merely amplifying that treatment and bringing it up to date.

We have attempted to include in the bibliography of each species, in addition to the original reference, all synonyms, references to important revisional works, and references to works which figure the species or the male genitalia, especially if they are generally available. We are also citing the type locality at the end of each original reference, both of valid names and of synonyms, if a locality is given by the author. The introductory matter is being included essentially in its original form, but the body of the paper includes many changes.

## HISTORICAL SKETCH

The first step toward a rational classification of the skippers was made by Scudder in 1874[2] when he proposed the division of the family, as he regarded it, into two tribes, the Hesperides and Astyci. These tribes represented approximately the genera *Thymele* and *Pamphila* of Fabricius' classification, published in Illiger's Magazine in 1807. Scudder based his tribes on the secondary sexual characters of the males and on characters found in the early stages.

This paper was followed in 1878 by Mabille's work on the Hesperiidae in the Brussels Museum.[3] Mabille adopted the tribes proposed by Scudder but subdivided them into several minor groups each. Scudder later expressed his approval of these divisions for the Hesperidi but reserved his judgment of the divisions of the Astyci.[4] Many of Mabille's groups are not repre-

[2] Bull. Buff. Soc. Nat. Hist. I, 195, 1874.
[3] Ann. Soc. Ent. Belg. XXI, 12, 1878.
[4] Butt. E. U. S. and Canada II, 1372, 1889.

sented in our fauna; the others have been the subject of very little dispute.

In the same year Burmeister published a paper in which the family was divided into four tribes.[5] The arrangement is so different from the generally accepted classification that none but historical interest attaches to it.

In 1879 Speyer produced a brief work[6] in Germany in which the first suggestion is made of the taxonomic importance of the position of vein $M_2$ of the primaries. This suggestion furnished the necessary complement to Scudder's foundation for the major divisions of the skippers, and these divisions are still in use.

Nothing further of importance was done in the systematic study of these insects until 1893, when Watson published his "Proposed Classification of the Hesperiidae[7]"; his classification is practically the same as the one now commonly used. Watson divided the family into three subfamilies, the Pyrrhopyginae, Hesperiinae, and Pamphilinae, equivalent to the Pyrrhopygini of Mabille and the two tribes of Scudder. He further subdivided the Hesperiinae into two groups and the Pamphilinae into three. Group C of the Pamphilinae is wholly Oriental and African; the others correspond to the similar divisions of Scudder in part. Watson mentioned the genus *Megathymus* only to indicate that it would form an additional subfamily if treated as a Hesperiid. The only changes which we make in this classification are the substitution of the names Pyrginae and Hesperiinae for the subfamilies Hesperiinae and Pamphilinae, respectively, and the elevation of the Megathymidae to family rank, together with some changes in the grouping of Watson's Pamphilid genera.

When Watson's paper appeared Godman and Salvin had been publishing, over a period of six years, parts of the three volumes on Rhopalocera of the Biologia Centrali-Americana. The first signature on skippers appeared a few months before Watson's revision but the work was not completed until 1901. The subfamilies are those of Watson and the Hesperiinae are divided as

[5] Desc. Phys. Rep. Arg., Lep. 245, 1878.
[6] Stett. ent. Zeit. XL, 477, 1879.
[7] Proc. Zool. Soc. London 3–132, pl. I–III, 1893.

in his classification, but the Pamphilinae, worked up by Godman after Salvin's death, are divided into eight groups. These are not wholly acceptable but they suggest an improvement over the two groups of other writers. The chief systematic interest of the Biologia lies in the number of genera described, the excellent plates, and the great value of the work for specific identifications.

Only one other paper, Mabille's "Famille Hesperidae,"[8] has been written on the Hesperioid fauna of the world. In it Mabille uses the same arrangement as that of Watson, excepting only the establishment of the subfamily Ismeninae to take the place of group C of the Pamphilinae, and the placing of *Megathymus* in the subfamily Megathyminae.

There remains to be mentioned Dyar's "Review of the Hesperiidae of the United States."[9] This brief paper was for many years the only synopsis of the skippers of this country, and in spite of omissions and commissions of an unusual nature it filled a great need of systematic lepidopterists. It was intended, as the name implies, merely as a synopsis of the genera and species, and followed the "Famille Hesperidae" with comparatively few changes.

When Lindsey's "Hesperioidea of America, North of Mexico"[10] appeared, these publications were the foundations of our system of classification. In recent years no important changes have been suggested, although numerous contributions have added to our knowledge of the species entering our area and the use of genera has shifted in many cases. Chief among the recent publications may be mentioned Draudt's work on the Hesperioidea in Seitz's "Macrolepidoptera of the World," Vol. V. Comstock's "Butterflies of California" treats the species of that state admirably, and Skinner and Williams' series of papers in the Transactions of the American Entomological Society illustrating the genitalia of the North American species are valuable.[11]

[8] Genera Insectorum XVII, 1903–4.

[9] Jn. N. Y. Ent. Soc. XIII, 111–141, 1905.

[10] Univ. Iowa Studies Nat. Hist., IX, No. 4, 1921.

[11] We are indebted to the American Entomological Society for permission to reproduce Skinner and Williams' illustrations of the genitalia in this paper. Since these figures are the major feature of the series we are not citing the references under each species, but the papers contain other data of interest. They appeared

Lindsey's "The Types of Hesperioid Genera"[12] is a useful work for reference in nomenclature. With the exception of the last two, these publications are freely cited in the bibliographies of species.

## CLASSIFICATION

It will be noted in the preceding sketch of the history of the skippers that they have been treated as the family Hesperiidae, equivalent to the several families of butterflies with which they have been associated. This rank was uniformly accepted for many years, but the structural uniformity of the group and their apparently intermediate position between the butterflies and moths have led to a tendency to group them in a major subdivision of the order. The tendency has been expressed in two ways: E. Reuter established a distinct suborder for the skippers under the name Grypocera,[13] and Spuler followed the same arrangement but used the name Netrocera.[14] Other writers have recognized the skippers as a superfamily, the Hesperioidea; this rank is now widely accepted.

In the first edition of this work the state of the major groups of Lepidoptera was considered briefly, with the conclusion that Comstock's suborders Frenatae and Jugatae were justified, and that the old suborders Rhopalocera and Heterocera must therefore be abandoned. As an indication of the rather obvious differences between butterflies and moths, however, the old names have some value, and it was proposed to retain them as series in the suborder Frenatae, the series Rhopalocera to be divided into two superfamilies, Papilionoidea and Hesperioidea, and the series Heterocera into four superfamilies. The arrangement of the latter series is undoubtedly more complex; at present it is difficult to find two writers in strict agreement on the desirable subdivisions, but the problem is one which has no proper place in a work of this limited scope.

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in the Transactions of the American Entomological Society, Vol. XLVIII, pp. 109–127, 1922; pp. 283–306, 1923; Vol. XLIX, pp. 129–153, 1923; Vol. L, pp. 57–74, 141–156, and 177–208, 1924.

[12] Ann. Ent. Soc. Am. XVIII, 75–106, 1925.

[13] Act. Soc. Sci. Fenn. XXII (I), 199, 1896.

[14] Die Schmetterlinge Europas I, 70, 1908.

We repeat the synopsis of the Frenatae essentially as it appeared in the first edition in order to indicate the position and general characters of the insects with which we deal:

SUBORDER FRENATAE

*Series Heterocera.* Antennae rarely clavate; when clavate, usually more or less pectinate or ciliate. Hind tibiae usually with two pairs of spurs; front legs normal. Frenulum present in many families. Venation of primaries generalized or characteristically specialized. Pupa usually loose in a cocoon, earthen cell, or in plant tissues. Superfamilies Sphingoidea, Saturnioidea, Bombycoidea, and others.

*Series Rhopalocera.* Antennae usually clavate to capitate, rarely with a scarcely perceptible expansion of the tip, never ciliate nor pectinate.

*Superfamily Hesperioidea.* Pupa suspended in a slight cocoon. Hind tibiae rarely with less than two pairs of spurs; front legs normal. Frenulum absent except in one Australian genus, *Euschemon.* Primaries with twelve veins, all from the cell.

*Superfamily Papilionoidea.* Pupa naked, usually suspended from silken attachments and specialized for concealment. Hind tibiae with only the terminal pair of spurs; front legs in the higher families greatly reduced, not functional. Frenulum absent. Primaries with less than twelve veins or with some stalked.

In the Hesperioidea we have three families, the Hesperiidae, Megathymidae, and Euschemonidae. The second includes only the genera *Megathymus* and *Aegiale,* and is equivalent to the subfamily of other writers. The first includes all other skippers except *Euschemon rafflesiae.* The Megathymidae are very closely related to the Hesperiinae (Pamphilinae Auct.), and may be regarded as a highly specialized branch from the same parent stock. The fact that the boring habit of the larvae is apparently acquired lends color to this opinion and the venation of the wings is strictly in harmony with it.

The Hesperiidae are divided into four subfamilies, the Pyrrhopyginae, Pyrginae (Hesperiinae Auct.), Hesperiinae (Pamphilinae Auct.), and Ismeninae, of which the first three are represented in North America. All are apparently natural groups and they may easily be distinguished. The only question regarding them is that of relative development. The Ismeninae are apparently the most primitive Hesperiidae, with the Pyrginae next. The higher Pyrginae, however, have attained very nearly the same development as the higher Hesperiinae, hence it is only generally

correct to regard the latter subfamily as more advanced. The Pyrrhopyginae and the Megathymidae show definite affinities with the Pyrginae and with the Hesperiinae respectively. We retain the customary arrangement, not because it is a good indication of phylogenetic relations, but because it shows as well as any linear series can the relations existing within this superfamily.

The separation of genera has been the most troublesome phase of the study of skippers since their classification first attained reasonable complexity. When the first edition of this work was published a thorough study of genera was badly needed, and the chief problem was whether the extreme splitting of Scudder or the extreme lumping of earlier lepidopterists marked the desirable course.

The conclusion was finally reached that many transitions of structure are still evident among Hesperioid species, and that genera may therefore contain a considerably range of structural variation if a gradual transition is evident among the included species. We are forced to retain this point of view. The structures of skippers provide little enough material for classification at the best, and genera must be separated by a combination of scientific methods and intuition which only a systematic entomologist can appreciate.

In the main, genera should be natural groups which indicate a definite trend in evolution, an ideal which it is often impossible to realize in working with the skippers. The poverty of structural characters, the close relationship of many species, and the apparently trivial differences which characterize many apparently valid genera, result in a chaos from which it is difficult to work out anything approaching sound phylogeny within the major subdivisions of the superfamily.

We reiterate the stand that secondary sexual characters are not a desirable basis for the separation of genera, although they may serve as valuable accessory characters. The mere presence or absence of a secondary sexual character should certainly not be used to separate genera, for we find both conditions very commonly in closely related species like those of *Thorybes*, *Erynnis*, and *Pyrgus*, and the degree of development may vary within a

single species, a condition which is conspicuously true of the genus *Chaerephon*. Nevertheless we feel that the development of these characters may be taxonomically useful; we hesitate to combine two genera in which a discal stigma occurs if the structure differs in fundamental form in the two.

The following brief summary of taxonomic characters in the the Hesperioidea is essentially that of the first edition.

The structures of systematic value in the Hesperioidea are found in all parts of the body. The size of the head serves to distinguish the two families, and its appendages, the palpi and antennae, offer a means of separating many genera. The palpi vary in length and position and in relative size of the second and third joints, but it is necessary to look at all of these characters in a general way. For example, in *Pholisora* we find great variation in the vestiture of the palpi and in the relative length of the third joint, but throughout the genus long palpi with smooth deep scaly vestiture, an oblique second joint, and a porrect third joint, are present. *Erynnis* has palpi of a similar form but with shaggy vestiture. The third joint in some genera is long, slender, and vertical.

The antennae have a characteristic slender tip which has been aptly termed the apiculus. This tip varies from the tiny point found in *Hesperia* to the long one of *Goniurus*, and has been entirely lost in some genera. The loss has apparently taken place by two distinct courses of evolution, first, the loss of the apiculus by gradual reduction and second, the thickening of the structure and its fusion with the body of the club. The first has apparently taken place in the Hesperiinae and the second in the Pyrginae. The relation of the length of the apiculus to the thickness of the club has been used extensively to separate certain genera of the Hesperiinae but its value is limited. It is variable in most species and only where it is extremely short or extremely long is the variation negligible. In such species as *verna* the apiculus is sometimes longer and sometimes shorter than the thickness of the club and is always difficult to measure with satisfactory accuracy. The length of the entire antenna measured in proportion to some other part of the insect is useful to distinguish a few genera of our fauna.

The legs offer three important characters, viz., the presence or absence of the epiphysis on the front tibiae, the presence or absence of spines on the mid tibiae and to a certain extent their form, and the number of pairs of spurs on the hind tibiae. The epiphysis does not concern us in a study of the North American fauna and the spurs of the hind tibiae characterize only one genus, but the spinulation of the mid tibiae is useful in several cases and in spite of some evidence to the contrary we believe that it is a good character, at least to the extent used in this paper.

The wings vary greatly in shape, sometimes in a striking way as in *Achlyodes*, *Antigonus*, and *Goniurus*. In certain other genera, such as *Atrytonopsis*, they have a distinctive form which is less pronounced in the female and is difficult to characterize accurately. The neuration is of comparatively little use beyond a few conspicuous features, for it is impossible to pick a reasonably long series of related species without finding some transition in all of the salient features. In spite of this limitation we have used characters of the veins to separate some genera. The position of vein $R_1$ of the primaries distinguishes *Chiomara* and *Erynnis*, although there are supplementary characters as well. The distance between the bases of $M_1$ and $R_5$ of the primaries in *Pholisora* is greater than in most other genera. The relation of vein $M_2$ to $M_1$ and $M_3$ in the primaries distinguishes the Megathymidae and most Hesperiinae from the other skippers and helps to separate some genera. The position of veins $Cu_1$ and $Cu_2$ of the primaries is another character which must be used with caution, for these veins vary in closely related species and can be depended upon only in extreme cases. The neuration of the secondaries is scarcely worthy of notice, though some exotic genera are characterized by the presence of vein $M_2$, which is usually absent or very weak.

The abdomen is of little service to the taxonomist, although it aids in distinguishing the Hesperiinae of group A from certain Pyrginae in that it projects well beyond the secondaries in the former group and scarcely reaches their anal angle in the latter.

The male secondary sexual characters in the Pyrginae consist of the costal fold on the primaries, tuft (always proximal in our

species) on the hind tibiae, tuft on the upper surface of the secondaries, and two lobes on the ventral surface of the abdomen at its base in *Pyrgus*. In the Hesperiinae the only secondary sexual character found in the North American fauna is the brand or stigma on the disk of the primaries. While we do not consider the presence or absence of these characters a sufficient foundation for genera, we believe that the great difference in form between some of the stigmata indicates sufficiently different development of the species concerned to warrant their generic separation. Fortunately in our fauna the character can be supplemented by others.

The genitalia, especially in the males, are of great value in making specific identifications and similarity of genitalic structure often affords an index of generic relationship. We have found several apparent contradications of the latter statement and are therefore inclined to use the principle cautiously until more is known about the skippers, but still we hesitate to include in the same genus species whose genitalia are of widely different forms unless other structures indicate close relationship. Genitalia are obviously more erratic in their variation than other structures.

With this brief introduction, which we present for its practical taxonomic value alone, we proceed to the systematic portion of our work. We should like to expand it without limit, but in this form we hope that it will be, as we have attempted to make it, an adequate manual for the identification of the North American species and a guide to the more important published works on these fascinating insects.

The sign † is used in the citation of references to indicate names cited in error and the sign ‡ to indicate preoccupied names.

## SUPERFAMILY HESPERIOIDEA

Antennae clavate, in a few genera with the club very slender. Club usually with a slender tip called the apiculus. Palpi variable, usually relatively large and thick, upturned to porrect. Head wide, eyes large and far apart, lashed. Insertion of antennae near eyes. Body stout, slender in a few genera. Wings relatively smaller than in the Papilionoidea and with very strong venation in most genera. Primaries with twelve veins, all free; cell open or weakly closed. One anal. Secondaries with eight or nine veins, $M_2$ usually absent; cell open. Two anals. Front legs normal, tibiae usually with the epiphysis present. Middle

legs with one pair of spurs on the tibiae and with or without spines. Hind legs with two pairs of spurs or with only the terminal pair.

The two families represented in our fauna are based on the following characters: HESPERIIDAE: Head nearly as wide to wider than thorax. Hind tibiae usually with two pairs of spurs. Palpi moderate to large. Larvae external plant feeders. MEGATHYMIDAE: Head narrower than thorax. Hind tibiae with one pair of spurs. Palpi rather small. Larvae borers in the stems of plants. Imagines larger than most Hesperioidea, heavy bodied and strong of flight.

## FAMILY HESPERIIDAE

Characters of the superfamily, distinguished from the Megathymidae as shown in the preceding synopsis. The North American species fall into three subfamilies which may be separated by the following key. This key also deals with the groups into which the subfamilies are divided.

### Key to the Subfamilies and Groups

1. Club of antennae large, entirely reflexed.....Pyrrhopyginae
   Club variable, never entirely reflexed.....2
2. Vein $M_2$ of primaries not curved at base, usually about intermediate between $M_1$ and $M_3$. Mid tibiae without spines.....Pyrginae, 3
   Vein $M_2$ curved at base, arising nearer to $M_3$, or with the mid tibiae spined. Hesperiinae, 4
3. Cell of primaries more than two-thirds as long as wing or antennae with a slender reflexed or recurved apiculus.....Group A
   Cell two-thirds or less. Club curved, blunt or fusiform, but never with a slender apiculus.....Group B
4. Vein $M_2$ intermediate, straight. Club blunt. Palpi porrect.....Group A
   Vein $M_2$ curved at base, nearer to $M_3$. Palpi not porrect. Group B of many authors.....5
5. Third joint of palpi slender and vertical. Antennae short, club blunt... Group B
   Third joint small or antennae with a slender apiculus.....Group C
   Cell of primaries two-thirds as long as wing, usually with a recurrent vein or a vestige of it.....Group D

## SUBFAMILY PYRRHOPYGINAE

This subfamily includes a large number of South and Central American species of which only one, *araxes*, occurs within our territory. The large antennal club, recurved or bent back along the shaft, is typical of all species. In other respects their structure agrees to a great extent with that of Group A of the Pyrginae. The cell of the primaries is apically produced, with the discocellular veins outwardly concave, and is about two-thirds as long as the wing. The discocellular veins are weak but clearly traceable. Vein $M_2$ is approximately intermediate between the other median branches in the primaries and is absent in the secondaries, although it appears in a few exotic genera.

*Araxes* has usually been included in the genus *Pyrrhopyge*. Its distinct habi-

tus and the characteristic form of the secondaries led to its removal in the first edition of this work, a step to which we adhere.

Genus **Apyrrothrix** Lindsey

Orthotype *Erycides araxes* Hewitson

*Apyrrothrix* Lindsey, Univ. Iowa Studies Nat. Hist. IX (4), 15, 1921.

Similar to *Pyrrhopyge*. Differs from that genus in the more gently curved costa and the more prominent apex of the primaries and in the form of the secondaries. In *Pyrrhopyge* these wings appear to be longer through the cell than along the inner margin and the outer margin is even or only slightly concave between veins $Cu_2$ and R. The abdomen usually equals or surpasses the anal angle of the secondaries. In *araxes* the secondaries are broad and full, and surpass the abdomen. Outer margin deeply crenulate, produced between veins $Cu_2$ and $M_3$ in the male and conspicuously so in the female. Pl. I, fig. 1.

1. **Apyrrothrix araxes** (Hewitson).

*Erycides araxes* Hewitson, Desc. Hesp. 2, 1867. Mexico.

*Pyrrhopyga cyrillus* Plötz, Stett. ent. Zeit. XL, 529, 1879. Oaxaca.

*Pyrrhopyge araxes* Godman and Salvin, Biol. Cent.-Am., Rhop. II, 252, pl. 73, fig. 14, 15, 16, 1893.

Holland, Butterfly Book, 319, pl. XLV, fig. 9, 1898.

Draudt, Seitz's Macrolep. V, 839, pl. 162 e, 1921.

*Eudamus* (*Erycides*) (*Pyrrhopyge*) *araxes* Skinner, Trans. Am. Ent. Soc. XXXVII, 201, 1911.

Mexico. Specimens from southern Arizona are often very close to *araxes* but the typical form is not known to occur north of the boundary.

1a. race **arizonae** Godman and Salvin. Pl. II, fig. 1.

*Pyrrhopyge araxes* form *arizonae* Godman and Salvin, Biol. Cent.-Am., Rhop. II, 253, 1893. Near Ft. Grant, Arizona.

*Pyrrhopyga araxes* Wright, Butt. W. Coast 255, pl. XXXII, fig. 481, 1905.

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PLATE I

Fig. 1. *Apyrrothrix araxes*, a. club of antenna; b. neuration. Fig. 2. Antennal clubs: a. *Heliopetes nivella;* b. *H. ericetorum;* c and d. *Pyrgus communis;* e. *P. syrichtus;* f. *H. macaira.* g. Neuration of *P. communis.* h. Outer margin of secondary of *P. syrichtus;* i. same, of *H. nivella.* j. Costal margin and apex of primary of *H. nivella;* k. same, of *P. syrichtus.* l. Cubital stem of *P. centaureae;* m. same, of *H. nivella.* Fig. 3. *Polygonus lividus*, a. club of antenna; b. neuration of primary. Fig. 4. *Goniurus*, a. palpus of *simplicius;* b. antennal club of *simplicius;* c. neuration of *proteus.* Fig. 5. *Phocides batabano*, neuration. Fig. 6. a. Antennal club of *Epargyreus zestos.* b. Antennal club of *Proteides mercurius.* c. Neuration of *E. tityrus.* Fig. 7. *Zestusa dorus*, a. palpus; b. club of antenna; c. neuration. Fig. 8. *Nascus hesus*, a. club of antenna; b. outline of primary. Fig. 9. *Chiomara asychis*, neuration of primary. Fig. 10. *Cecropterus cellus*, a. club of antenna; b. detail of neuration, anal area of secondary.

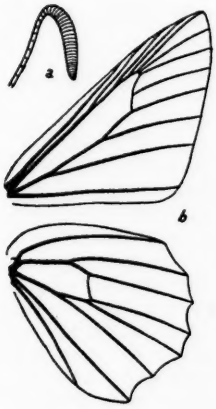


Fig.1.

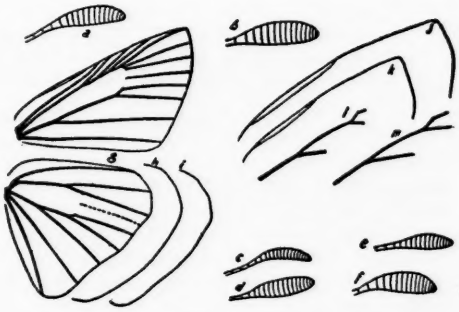


Fig. 2.

Fig. 3.

Fig. 4.

Fig. 5.

Fig. 6.

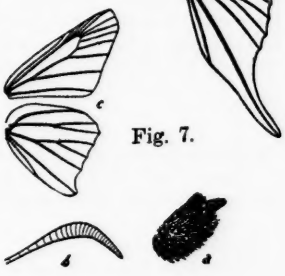


Fig. 7.

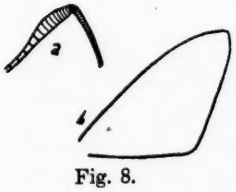


Fig. 8.

Fig. 9.

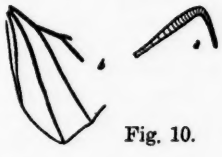


Fig. 10.

*Eudamus* (*Erycides*) (*Pyrrhopyge*) *araxes* form *arizonae* Skinner, Trans. Am. Ent. Soc. XXXVII, 201, pl. X, 1911.

*Pyrrhopyge arizonae* Draudt, Seitz's Macrolep. V, 839, 1921.

*Arizonae* occurs in Arizona from May to September; Marfa, Texas, November.

## SUBFAMILY PYRGINAE

Structure very diverse but always showing the characters mentioned in the key. Antennae varying in length, club flattened oval to extremely long and slender, with the distal half or less reflexed or recurved. Palpi with the second joint closely applied to the front and the third minute to long, large, and porrect. Neuration fairly constant. Branches of radius variable in position, vein $M_2$ straight and about intermediate between $M_1$ and $M_3$, $Cu_2$ variable. Secondaries with R variable in position and $M_2$ absent to weakly tubular at its outer end (*Erynnis*, some specimens), usually marked by a fold. Mid tibiae without spines. Two pairs of spurs present on hind tibiae in our genera. Secondary sexual characters of the males: costal fold on primaries, tibial tuft on hind legs, tuft on upper surface of secondaries, and basal lobes on under surface of abdomen.

### GROUP A

Group A is more widely represented in South and Central America and a number of our species are merely strays from more southern localities. The genera have been inconsistently treated in the past; we retain the changes which were introduced in the first edition of this paper, but without feeling that they represent the last word in generic revision. It is probable that our *Goniurus* should be separated into two genera, but since the separation would require the establishment of a new genus we are leaving it to a later date. The group is distinguished by the length of the cell and by the form of the antennal club.

#### Key to the Genera

1. Lower discocellular of primaries very long and curved..... *Phocides*
   Lower discocellular normal.....2
2. Apiculus of antennae longer than body of club, straight and sharply reflexed. *Nascus*
   Apiculus otherwise.....3
3. Primaries with a tubular, or at least well marked, recurrent vein in cell.....4
   Recurrent vein scarcely evident or absent.....9
4. Antennae with a distinct, slender, reflexed apiculus.....5
   Antennal club fusiform, more or less elongate, arcuate or with a well-rounded bend at middle.....7
5. Secondaries tailed..... *Goniurus*
   Secondaries not tailed.....6
6. Apiculus sharply bent; primaries apically produced..... *Proteides*
   Apiculus recurved; apex of primaries moderate..... *Epargyreus*
7. Recurrent vein nearer to $M_3$ than to $Cu_1$.....8
   Recurrent vein nearer to $Cu_1$..... *Chioides*
8. Outer margin of secondaries slightly crenulate..... *Codatractus*
   Outer margin even..... *Telegonus*

9. Club of antennae large, fusiform..... *Zestusa*
Club more slender, with a distinct apiculus.....10
10. Apiculus much shorter than body of club, bent at a right angle.....11
Apiculus about as long as rest of club, usually sharply reflexed or recurved...13
11. Secondaries lobed..... *Polygonus*
Secondaries broadly rounded or merely produced at the anal angle.....12
12. Male with a tuft of scales on upper surface of hind wings; palpi moderate. *Cogia*
No tuft. Palpi exceeding front by about length of head..... *Phoedinus*
13. Vein 3rd A of secondaries about two-thirds as long as 1st A. Primaries with broad yellow band..... *Cecropterus*
Vein 3rd A longer. Primaries with spots or a broken yellow band.....14
14. Outer margin of secondaries broadly rounded; of primaries slightly and almost evenly convex..... *Thorybes*
Outer margin of secondaries more or less produced and angled at 1st A; of primaries slightly sinuate..... *Achalarus*
Outer margin of secondaries with a slight truncate lobe between veins $Cu_1$ and $M_3$..... *Cabares*

## Genus **Phocides** Hübner

Logotype *Phocides cruentus* Hübner. (*palemon* Cr.)

*Phocides* Hübner, Verz. bek. Schmett. 103, 1820.

*Erycides* Hübner, Verz. bek. Schmett. 110, 1820. Logotype *Papilio pygmalion* Cramer.

*Dysenius* Scudder, Rept. Peabody Acad. 1871, 67 (46), 1782. Orthotype *Erycides albicilla* H.-S.

Palpi oblique, vestiture smooth, deep, and scaly; third joint small. Antennae with club rather long, moderately thick; apiculus not more than one-half as long as rest of club, very slender and abruptly bent. Primaries shaped as in *Goniurus*, with a costal fold in the male. Cell over two-thirds as long as wing. Vein $M_2$ nearer to $M_1$ than to $M_3$; lower discocellular long and strongly curved. Vein $Cu_1$ near end of cell and $Cu_2$ well toward base of wing. Recurrent vein faint, at base of $M_3$. Secondaries produced toward anal angle, with outer margin sharply bent at 1st A but not lobed. Outer margin only slightly irregular. *Phocides* is easily recognized by the general habitus of the species when once seen. Pl. I, fig. 5.

### Key to the Species

Primaries immaculate, black..... *batabano*
Primaries with a red spot above..... *lilea*
Primaries with hyaline white spots..... *urania*

1. **Phocides batabano** (Lucas). Pl. II, fig. 2.

*Eudamus batabano* Lucas, Sagra's Hist. Cuba VII, 624, 1856. Cuba.

*Erycides mancinus* Herrich-Schaeffer, Corr.-Blatt Regensb. XVI, 143, 1862. Cuba.

*Erycides okeechobee* Worthington, Papilio I, 133, 1881. Florida.

*Eudamus* (*Phocides*) (*Erycides*) *batabano* Skinner, Trans. Am. Ent. Soc. XXXVII, 199, pl. X, 1911.

*Phocides batabano* Draudt, Seitz's Macrolep. V, 850, pl. 165d, 1921.
Southern Florida, January to July.

2. **Phocides lilea** (Reakirt). Pl. II, fig. 3.
*Erycides lilea* Reakirt, Proc. Acad. Nat. Sci. Phil. 339, 1866. Mexico, near Vera Cruz.
*Erycides albicilla* Herrich-Schaeffer, Corr.-Blatt Regensb. XXIII, 169, 1869. Trop. America.
*Erycides socius* Butler and Druce, Cist. Ent. I, 112, 1872. Cartago, Costa Rica.
*Dysenius cruentus* Scudder, Rept. Peabody Acad. 1871, 67 (46), 1872. Guatemala.
*Erycides sanguinea* Scudder, op. cit. 68 (47), 1872. Texas.
*Erycides decolor* Mabille, Bull. Soc. Ent. France, p. xlvi, 1880.
*Phocides lilea* Godman and Salvin, Biol. Cent.-Am., Rhop. II, 296, pl. 76, fig. 23, 24, 1893.
Draudt, Seitz's Macrolep. V, 850, pl. 165d, 1921.
*Erycides* (*Phocides*) *lilea* Skinner, Trans. Am. Ent. Soc. XXXVII, 199, 1911.
The only specimens which we have seen are from Central America. Skinner lists a Texas record by Captain Pope in the Mexican Boundary Survey.

3. **Phocides urania** (Westwood and Hewitson).
*Erycides urania* Westwood and Hewitson, Gen. Diurn. Lep. II, 510, pl. 79, fig. 1, 1852. Mexico.
Aaron, Ent. News I, 23, pl. L, 1890. Texas.
*Erycides texana* Scudder, Rept. Peabody Acad. 1871, 68 (47), 1872. Texas.
*Erycides* (*Phocides*) *urania* Skinner, Trans. Am. Ent. Soc. XXXVII, 198, 1911.
*Phocides urania* Draudt, Seitz's Macrolep. V, 850, pl. 165f, 1921. Texas, Arizona, and southward.

## Genus **Nascus** Watson

Orthotype *Papilio phocus* Cramer

*Nascus* Watson, Proc. Zool. Soc. London 28, 1893.

Watson characterized this genus as follows: "Antennae: club rather robust, bent into a hook, terminal portion very slender and rather longer than rest of club. Palpi upturned, third joint almost concealed. Fore wing: outer margin very much longer than inner margin, the apex being conspicuously produced; cell more than two-thirds the length of costa; male with a costal fold; discocellulars very oblique, the lower one slightly longer; . . . Hind tibiae with a long fringe of coarse hairs and with two pairs of spurs." The remainder of his account of the venation, in terms of the Comstock-Needham system, is as follows: Vein $Cu_1$ shortly before end of cell; vein $Cu_2$ close to base of wing. Hind wing anally produced, and with an inconspicuous tooth at vein 2nd A; vein R close to end of cell; discocellulars and vein $M_2$ barely traceable; vein $Cu_1$ immediately before the end of the cell; vein $Cu_2$ considerably nearer to end of cell than to base of wing. Pl. I, fig. 8.

1. **Nascus hesus** (Westwood and Hewitson). Pl. II, fig. 4.
? *Papilio nicias* Fabricius, Mant. Ins. 86, 1787.

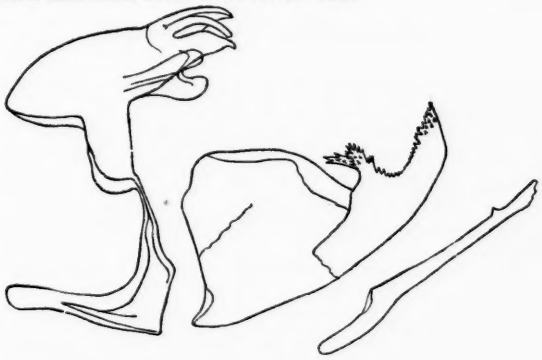


Fig. 1.

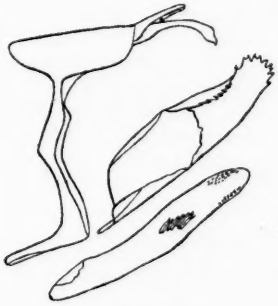


Fig. 2.

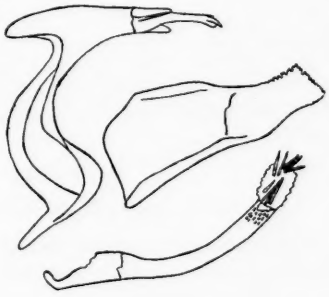


Fig. 3.

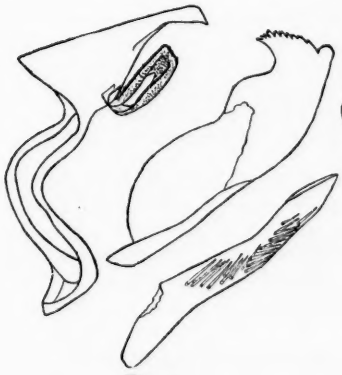


Fig. 4.

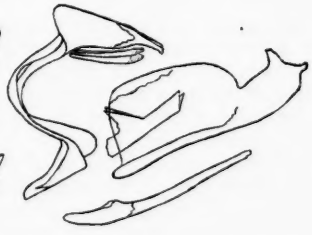


Fig. 5.



PLATE II. MALE GENITALIA

Fig. 1. *Apyrrothrix araxes arizonae.* Fig. 2. *Phocides batabano.* Fig. 3. *P. lilea.* Fig. 4. *Nascus hesus.* Fig. 5. *Polygonus lividus arizonensis.*

*Goniloba hesus* Westwood and Hewitson, Gen. Diurn. Lep. II, 513, 1852.
*Telegonus hesus* Id., op. cit. II, pl. 78, fig. 5, 1852.
? *Eudamus etias* Hewitson, Desc. Hesp. I, 13, 1867. Amazon.
*Telegonus gaurus* Plötz, Berl. Ent. Zeit. XXVI, 79, 1882. Rio Negro.
*Eudamus hesus* Aaron, Ent. News I, 23, 1890.
Id., op. cit. II, 101, pl. I, fig. 2, 1891.
† *Nascus euribates* Godman and Salvin (Cramer?), Biol. Cent.-Am., Rhop. II, 736, 1901.
† *Eudamus* (*Nascus*) *euribates* Skinner, (Cramer?), Trans. Am. Ent. Soc. XXXVII, 191, pl. X, 1911.
*Nascus hesus* Draudt, Seitz's Macrolep. V, 873, pl. 170a, 1922.

Mexico to Brazil and Bolivia. Skinner includes Texas, presumably following Aaron. We have no authentic record of North American specimens.

We have compared Cramer's, Westwood and Hewitson's, and Skinner's figures; the two latter agree very well. We are unable to match Cramer's figure of the female with any specimens, although there is a female in the Philadelphia Academy from Manicore, Brazil, which can be definitely associated with males of *hesus*. There can be no doubt of the identity of *hesus* since the name is based on figures of males, but the possible synonymy of *hesus* and *euribates* must remain in question.

## Genus **Polygonus** Hübner

Haplotype *Polygonus lividus* Hübner

*Polygonus* Hübner, Samml. exot. Schmett. II, t. 144, 1822–6.
‡ *Acolastus* Scudder, Rept. Peabody Acad. 1871, 71 (50), 1872. Orthotype *Hesperia savigny* Latreille
*Nennius* Kirby, Wytsman's Hübner, 105, 1902. New name for *Polygonus* and *Acolastus*.

Second joint of palpi appressed, densely scaled; third porrect, small. Reflexed apiculus sharply constricted, about one-half as long as rest of club. Head slightly wider than thorax. Primaries narrow, costa evenly curved, inner margin nearly straight and outer margin sharply curved opposite cell; no costal fold in male. Cell three-fourths as long as wing; Vein $M_2$ about equidistant between $M_1$ and $M_3$; spur vein scarcely traceable, nearer to $Cu_1$. Secondaries broadly rounded, lobed at anal angle. Pl. I, fig. 3.

According to Scudder (Hist. Sketch 253) *Polygonus* was preoccupied by *Polygona* in the Mollucsa. *Acolastus* was preoccupied in the Coleoptera, a fact which was overlooked for many years, and Kirby offered *Nennius* to replace it. According to current provisions of the International Rules of Zoological Nomenclature *Polygonus* is valid since it differs in one letter from *Polygona*, and may therefore be retained.

1. **Polygonus lividus** Hübner.
† *Papilio amyntas* Fabricius (not Poda), Syst. Ent. 533, 1775.
*Polygonus lividus* Hübner, Samml. exot. Schmett. II, t. 144, 1822–26.
Barnes and Benjamin, Bull. S. Cal. Acad. XXV (1), 21, 1926.
*Hesperia savigny* Latreille, Enc. Meth. IX, 741, 1823. Antilles.

† *Pamphila amyntas* Staudinger, Exot. Schmett. 297, pl. 99, 1888.

† *Acolastus amyntas* Godman and Salvin, Biol. Cent.-Am., Rhop. II, 304, pl. 77, fig. 9 (♂ gen.), 1893.
Draudt, Seitz's Macrolep. V, 862, pl. 166g, 1917.

† *Eudamus* (*Acolastus*) (*Erycides*) *amyntas* Skinner, Trans Am. Ent. Soc. XXXVII, 200, pl. X, 1911.

The typical form occurs in Florida in August, September, and October, and extends southward through the West Indies, Central America, and South America to Brazil and Bolivia.

1a. race **arizonensis** Skinner. Pl. II, fig. 5.

*Erycides amyntas* var. *arizonensis* Skinner, Trans. Am. Ent. Soc. XXXVII, 209, pl. X, 1911. Florence, Arizona.

*Polygonus lividus arizonensis* Comstock, Butt. Cal. 203, pl. 57, fig. 10, 11, 1927.

This western race is paler than the typical form, both above and below, and the pale transverse bands of the secondaries are faintly visible on the upper surface. It has been taken in Texas and Arizona in May, July, and September.

Long series of *lividus* show a wide range of variation, sometimes approaching *arizonensis* in other regions. We feel that the racial name is worthy of retention, since it apparently marks the tendency toward paleness in arid regions which has been noted in many Lepidoptera.

## Genus **Proteides** Hübner

Logotype *Papilio mercurius* Fabricius (*idas* Cr.)

*Proteides* Hübner, Verz. bek. Schmett. 104, 1820.

*Dicranaspis* Mabille, Ann. Soc. Ent. Belg. XXI, 24, 1878. Haplotype *Papilio idas* Cramer.

*Proteides* is very close to *Epargyreus*, and the two may run together in the tropical fauna. In our fauna, however, the sharply constricted and reflexed apiculus and the narrow apically produced primaries of *Proteides* are very distinctive. The male has no costal fold. Pl. I, fig. 6.

1. **Proteides mercurius** (Fabricius). Pl. III, fig. 1.

† *Papilio idas* Cramer (not Linnaeus), Pap. Exot. III. 118, pl. CCLX, A, B, 1779–80. Surinam.
Sepp, Surin. Vlind. III, 231, pl. 104, 1855.

*Papilio mercurius* Fabricius, Mant. Ins. II, 86, 1787. Id., Ent. Syst. III, 333, 1793. Cayenne.

*Proteides idas* Godman and Salvin, Biol. Cent.-Am., Rhop. II, 301, pl. 77, fig. 5 (♂ gen.), 1893.
Draudt, Seitz's Macrolep. V, 861, pl. 166d, 1917.

*Eudamus* (*Proteides*) *idas* Skinner, Trans. Am. Ent. Soc. XXXVII, 194, 1911.

Occurs in Texas, New Mexico and Arizona, and ranges southward into Paraguay.

### Genus **Epargyreus** Hübner

Logotype *Papilio tityrus* Fabricius

*Epargyreus* Hübner, Verz. bek. Schmett. 105, 1820.

Second joint of palpi closely appressed, densely clothed with scales in which the small third joint is almost concealed. Antennae about one-half as long as the primaries, club more or less sharply curved at the middle. Head not quite as wide as thorax. Primaries elongate, rather narrow, outer and inner margins about equal in length, outer slightly more oblique but otherwise similar to *Goniurus*. Costal fold present. Cell three-quarters as long as wing; vein $M_2$ slightly nearer to $M_3$ than to $M_1$. Recurrent vein nearer to $Cu_1$. Anal strongly sinuate. Secondaries rounded, lobed at anal angle. Pl. I, fig. 6.

The primaries are narrower in *exadeus* than in *zestos* and *tityrus*, and the apiculus of the antennae shows a tendency to be more slender and more sharply bent. These characters bear out the conclusion stated under *Proteides*, that the two genera are possibly not distinct.

#### Key to the Species

1. Under surface of secondaries with a silky white patch.....2
   No silky white on secondaries.....*zestos*
2. Spots of primaries deep yellow and usually broadly contiguous.....*tityrus*
   Spots small and widely separated or if larger very pale yellow.....*exadeus*

1. **Epargyreus zestos** (Geyer). Pl. III, fig. 2.

   *Proteides zestos* Geyer, Zutr. exot. Schmett. IV, 9, t. 106, fig. 615, 616, 1832. Surinam.

   *Eudamus oberon* Worthington, Papilio I, 132, 1881. Marco Id., Florida.

   *Eudamus* (*Epargyreus*) *zestos* Skinner, Trans. Am. Ent. Soc. XXXVII, 193, 1911.

   *Epargyreus zestos* Draudt, Seitz's Macrolep. V, 861, pl. 166g, 1917.

Florida, south to the Antilles. Our records show that it flies in almost every month from January to November, hence we conclude that it is probably active throughout the year.

2. **Epargyreus tityrus** (Fabricius). Pl. III, fig. 3.

   *Papilio tityrus* Fabricius, Syst. Ent. 532, 1775.

   *Papilio clarus* Cramer, Pap. Exot. I, 66, pl. XLI, E, F, 1775. Surinam.

   *Epargyreus tityrus* Scudder, Butt. E. U. S. II, 1399, 1889.

   Holland, Butterfly Book 323, pl. XLIII, fig. 5, pl. II, fig. 30, 31, 33, pl. VI, fig. 22, 25, 26, 1898.

   Draudt, Seitz's Macrolep. V, 860, pl. 166e, 1917.

   Comstock, Butt. Cal. 203, fig. A65, pl. 57, fig. 12, 13, 1927.

   *Eudamus tityrus* Wright, Butt. W. Coast 254, pl. XXXII fig. 474, 1905.

   *Eudamus* (*Epargyreus*) *tityrus* Skinner, Trans. Am. Ent. Soc. XXXVII, 192, 1911.

Ranges throughout the United States and into southern Canada and South America. It appears in March in the south and in May in the north, and flies until September.

Fig. 1.

Fig. 2.

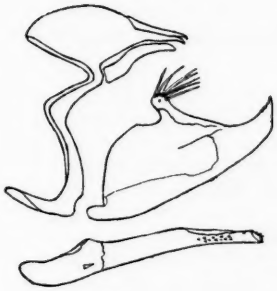


Fig. 3.

Fig. 4.

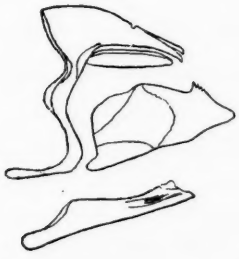


Fig. 5.

Fig. 6.



PLATE III. MALE GENITALIA

Fig. 1. *Proteides mercurius.* Fig. 2. *Epargyreus zestos.* Fig. 3. *E. tityrus.* Fig. 4. *E. exadeus.* Fig. 5. *Goniurus proteus.* Fig. 6. *G. dorantes.*

2a. ab. **obliteratus** Scudder.

*Epargyreus tityrus* ab. *obliteratus* Scudder, Butt. E. U. S. II, 1402, 1889. Boston, Mass.

This aberration has only three small rounded spots in place of the discal band, and only one small preapical spot. The silky patch below is more extensive than usual.

2b. ab. **smythi** Williams.

*Eudamus tityrus* ab. Smyth, Ent. News XIX, 191, pl. X, 1908. Charleston, S. C.

*Epargyreus tityrus* ab. *smythi* Williams, Trans. Am. Ent. Soc. LIII, 262, 1927.

In this aberration the spots are broadly confluent and are extended throughout the distal half of the cell and adjacent areas. The silver spot on the under side of the hind wing "is reduced to a mere dash along the base of the cell, and an isolated faint mark at right angles to and touching sub-costal vein opposite base of cell." (Smyth).

3. **Epargyreus exadeus** (Cramer). Pl. III, fig. 4.

*Papilio exadeus* Cramer, Pap. Exot. III, 118, pl. CCLX, C, 1779–80. Surinam.

*Thymele exadeus* Staudinger, Exot. Schmett. 290, pl. 98, 1888.

*Epargyreus exadeus* Godman and Salvin, Biol. Cent.-Am,. Rhop. II, 299, pl. 77, fig. 1 (male gen.), 1893.

Draudt, Seitz's Macrolep. V, 860, pl. 166e, 1917.

Williams, Trans. Am. Ent. Soc. LIII, 262, fig. 1, 2, (male gen.), 1927.

Comstock, Butt. Cal. 204, pl. 57, fig. 14, 1927.

*Eudamus* (*Epargyreus*) *exadeus* Skinner, Trans. Am. Ent. Soc. XXXVII, 194, pl. X, 1911.

*Eudamus clavicornis* Herrich-Schaeffer, Corr.-Blatt Regensb. XXIII, 186, 1869.

*Epargyreus orizaba* Scudder, Rept. Peabody Acad. 1871, 70, 1872. Guatemala.

The species is common from Mexico to Bolivia and Brazil, and has been taken in March in southern California, Arizona, and New Mexico.

## Genus **Goniurus** Hübner

Logotype *Papilio proteus* Linnaeus

*Goniurus* Hübner, Verz. bek. Schmett. 104, 1820.

*Eudamus* Swainson, Zool. Ill. (2), II, 48, 1831–2. Orthotype *Papilio proteus* Linn.

? *Polythrix* Watson, Proc. Zool. Soc. London 19, 1893. Orthotype *Eudamus metallescens* Mabille.

Second joint of palpi closely appressed, third porrect, small. Antennae a little over one-half as long as primaries, club slender, apiculus shorter and distinctly more slender than remainder of club. Primaries broad and short; outer margin evenly rounded to slightly sinuate, about as long as inner; costa evenly rounded, relatively short, without fold in one species. Cell two-thirds as long as wing; vein $M_2$ slightly nearer to $M_3$ than to $M_1$. Secondaries with anal angle produced

into a long tail; outer margin slightly excavated opposite cell and before tail, sometimes slightly crenulate. Pl. I, fig. 4.

KEY TO THE SPECIES

1. Upper surface with shining green hairs.....*proteus*
   Without green hairs.....2
2. Fringes checkered; spots not united to form a straight band.....*dorantes*
   Fringes not checkered; band usually present.....3
3. Band always present; no costal fold in male; outer margin of primaries slightly sinuate.....*eurycles*
   Band sometimes broken or even absent; male with fold; outer margin slightly convex.....*simplicius*

1. **Goniurus proteus** (Linnaeus). Pl. III, fig. 5.

   *Papilio proteus* Linnaeus, Syst. Nat. I, 484, 1758.
   *Urbanus fortis proteus* Hübner, Samml. exot. Schmett. I, pl. 555, fig. 2, 4, 1816–20.
   *Thymele domingo* Scudder, Rept. Peabody Acad. 1871, 69, 1872. Haiti.
   *Goniurus proteoides* Plötz, Bull. Soc. Nat. Mosc. IV, (2), 11, 1880.
   *Eudamus proteus* Scudder, Butt. E. U. S. II, 1386, 1889.
   Godman and Salvin, Biol. Cent.-Am., Rhop. II, 277, pl. 75, fig. 5, 1893.
   Holland, Butterfly Book 321, pl. XLV, fig. 6, 1898.
   Draudt, Seitz's Macrolep. V, 853, pl. 160b, 1921.
   *Eudamus* (*Goniurus*) *proteus* Skinner, Trans. Am. Ent. Soc. XXXVII, 194, 1911.
   *Goniurus proteus* Comstock, Butt. Cal. 204, fig. A66, pl. 57, fig. 15, 16, 1927.

New York (rare) to Florida, westward through the Gulf States to southern California; southward into South America.

2. **Goniurus dorantes** (Stoll). Pl. III, fig. 6.

   *Papilio dorantes* Stoll, Pap. Exot. Supp. 172, pl. XXXIX, fig. 9, 1790. Surinam.
   † *Urbanus fortis proteus* Hübner (not Linnaeus), Samml. exot. Schmett. I, pl. 155, fig. 1, 3, 1806–10.
   *Eudamus amisus* Hewitson, Desc. Hesp. 5, 1867.
   *Eudamus protillus* Herrich-Schaeffer, Corr.-Blatt Regensb. XXIII, 171, 1869. Tropical America.
   *Goniurus kefersteinii* Plötz, Bull. Soc. Nat. Mosc. LV, 11, 1880. Caracas.
   *Eudamus dorantes* Godman and Salvin, Biol. Cent.-Am., Rhop. II, 278, pl. 75, fig. 7 (male gen.), 1893.
   *Eudamus protillus* var. *rauterbergi* Skinner, Ent. News VI, 118, 1895.
   *Eudamus* (*Goniurus*) *dorantes* Skinner, Trans. Am. Ent. Soc. XXXVII, 197, 1911.
   *Goniurus dorantes rauterbergi* Comstock, Butt. Cal. 205, pl. 57, fig. 17, 1927.

We have records of this species from Southern California, in June, and from Texas and Arizona, June to October. It extends south to southern Brazil.

3. **Goniurus simplicius** (Stoll). Pl. IV, fig. 1.

   *Papilio simplicius* Stoll, Pap. Exot., Supp., 171, pl. XXXIX fig. 6, 6e, 1790. Surinam.

† *Urbanus fortis dorantes* Hübner (not Stoll), Samml. exot. Schmett. I, pl. 154, fig. 2, 4, 1806–16.

*Goniurus pilatus* Plötz, Bull. Soc. Nat. Mosc. LV, 2, 1880. Bahia and Surinam.

*Goniurus procne* Plötz, op. cit. LV, 3, 1880. Brazil.

*Eudamus simplicius* Godman and Salvin, Biol. Cent.-Am., Rhop. II, 270, pl. 75, fig. 1, (male gen.), 1893.
Draudt, Seitz's Macrolep. V, 855, pl. 160e, 1921.

*Thymele theimei* Ehrmann, Can. Ent. XXXIX, 321, 1907. San Pedro Sula, Honduras.

*Thymele borja* Id., op. cit. p. 322, 1907. Barja, Bolivia.

*Eudamus* (*Thymele*) *simplicius* Skinner, Trans. Am. Ent. Soc. XXXVII, 196, 1911.

Some females are difficult to distinguish from *eurycles*, but usually the obsolescence of the hyaline marks on the primaries and the slightly different shape of the wings enable one to recognize the species. The males are readily identified by the costal fold.

Texas; March, October, and November. Rare in the United States but a common tropical species.

4. **Goniurus eurycles** (Latreille). Pl. IV, fig. 2.

*Hesperia eurycles* Latreille, Enc. Meth. IX, 730, 1823. Brazil.

*Goniurus zalanthus* Plötz, Bull. Soc. Nat. Mosc. LV, 3, 1880. Allagra.

*Goniurus zagorus* Id., op. cit. p. 3, 1880. Allagra.

*Goniurus latipennis* Mabille and Vuillot, Nov. Lep. fasc. V, p. 36, pl. V, fig. 1, 1891. Cayenne.

*Eudamus eurycles* Godman and Salvin, Biol. Cent.-Am., Rhop. II, 272, 1893.
Skinner, Ent. News XII, 171, 1901.

*Eudamus* (*Goniurus*) *eurycles* Skinner, Trans. Am. Ent. Soc. XXXVII, 197, pl. X, 1911.

*Eudamus simplicius-eurycles* Draudt, Seitz's Macrolep. V, 855, pl. 160e, 1921.

This is a common South and Central American species, but we are unable to verify its reported occurrence in the United States. It is possibly a rare visitor.

## Genus **Chioides** Lindsey

Orthotype *Eudamus albofasciatus* Hewitson

*Chioides* Lindsey, Univ. Iowa Studies Nat. Hist. IX, (4), 25, 1921.

Palpi large, porrect; second joint deeply scaled, third strong, conspicuous. Antennae less than one-half as long as primaries, club relatively smaller and thicker than in *Goniurus*, and more broadly curved, with the apiculus less distinct. Primaries with the apex subtruncate; outer margin concave below apex. Cell about three-fourths as long as wing; recurrent vein nearer to $Cu_1$ than to $M_3$; bases of $Cu_1$ and $M_3$ much farther apart than the middle and lower discocellular veins combined. Costal fold present in our species. Pl. VIII, fig. 1.

*Catillus*, a Central American species, and *albofasciatus* are very closely related and agree in the form of the male genitalia. *Zilpa* differs somewhat in the form of the wings and in the male genitalia, but on the whole it is apparently related

to the other species and with them distinct from *Goniurus*. The difference is scarcely greater than that between *proteus* and *simplicius*.

1. **Chioides albofasciatus** (Hewitson). Pl. IV, fig. 3.
   *Eudamus albofasciatus* Hewitson, Desc. Hesp. 3, 1867. Polochic Valley, Guatemala.
   Id., Exot. Butt. V, *Eudamus* II, fig. 15, 1875.
   Godman and Salvin, Biol. Cent.-Am., Rhop. II, 289, pl. 75, fig. 11 (male gen.), 1893.
   Draudt, Seitz's Macrolep. V, 855, pl. 160d, 1921.
   *Eudamus* (*Goniurus*) *albofasciatus* Skinner, Trans. Am. Ent. Soc. XXXVII, 197, 1911.

Distinguished from *zilpa* by the long narrow white band on the under surface of the secondaries.

The species has been taken in Texas in March, June, and August and in Arizona in March, July, and from September to October. It extends into Central America.

2. **Chioides zilpa** (Butler). Pl. IV, fig. 4.
   *Goniurus zilpa* Butler, Lep. Exot. 109, pl. XL, fig. 2, 1872. Cartago, Costa Rica.
   *Eudamus zilpa* Godman and Salvin, Biol. Cent.-Am., Rhop. II, 279, pl. 75, fig. 8 (male gen.), 1893.
   Draudt, Seitz's Macrolep. V, 854, pl. 160d, 1921.
   *Eudamus zilpha* Skinner, Ent. News XII, 171, 1901.

Patagonia Mts., Arizona, May, Kerrville, Texas, September. The species extends into South America.

## Genus **Codatractus** Lindsey

Diatype *Heteropia imitatrix* Mabille

‡ *Heteropia* Mabille, Le Nat. 68, 1889. Preoccupied in sponges by *Heteropia* Carter, 1886.

*Codatractus* Lindsey, Univ. Iowa Studies Nat. Hist. IX, (4), 26, 1921.

Structure in general similar to that of *Chioides* but with veins $Cu_1$ and $M_3$ of the primaries not so far apart and the recurrent vein nearer to $M_3$ than to $Cu_1$. The antennal club is fusiform, more or less sharply bent near the middle but with the distal portion not differentiated into a distinct apiculus. Outer margin of primaries slightly sinuate; no costal fold. Pl. VIII, fig. 1.

We agree in continuing the use of this genus for both tailed species and species without tails. *Alcaeus* agrees with *melon* very closely in structure, and the male genitalia of the two species are very similar.

1. **Codatractus alcaeus** (Hewitson). Pl. IV, fig. 5.
   *Eudamus alcaeus* Hewitson, Desc. Hesp. 3, 1867. Nicaragua.
   Skinner, Ent. News XII, 171, 1901.
   *Thymele montezuma* Scudder, Rept. Peabody Acad. 1871, 70, 1872. Tehuantepec.

Mexico to Ecuador. The reference to the Entomological News is the only record of its occurrence in the United States with which we are familiar.

2. **Codatractus melon** (Godman and Salvin).

*Heteropia melon* Godman and Salvin, Biol. Cent.-Am., Rhop. II, 297, pl. 76, fig. 26, 27, 1893. Mexico and Guatemala.

Draudt, Seitz's Macrolep. V, 859, pl. 161f, 1922.

*Eudamus* (*Heteropia*) *melon* Skinner, Trans. Am. Ent. Soc. XXXVII, 186, 1911.

The typical form of *melon* is not known to occur north of Mexico.

2a. race **arizonensis** Skinner. Pl. IV, fig. 6.

*Eudamus* (*Heteropia*) *melon* var. *arizonensis* Skinner, Ent. News XVI, 232, 1905. Baboquivari and Santa Rita Mountains, Ariz.

Id., Trans. Am. Ent. Soc. XXXVII, 186, pl. X, 1911.

The race differs from typical *melon* in the whiter marginal area of the under surface of the secondaries. It flies in Arizona in June and July.

## Genus **Telegonus** Hübner

Logotype *Papilio talus* Cramer

*Telegonus* Hübner, Verz. bek. Schmett. 104, 1820.

Palpi oblique, third joint distinct. Antennae with a long slender tapering club, not sharply bent but curved at the middle. Primaries broad, outer margin equal to inner; costa slightly curved, without a fold in the male; outer margin very slightly sinuate. Secondaries produced and angled at vein 1st A; outer margin straight from vein R to anal angle. Cell of primaries about two-thirds as long as wing, discocellulars very oblique; vein $M_2$ slightly nearer to $M_3$ than to $M_1$; recurrent vein near $M_3$; vein $Cu_2$ over one-half as far from base of wing as from $Cu_1$.

1. **Telegonus hahneli** (Staudinger).

*Aethilla hahneli* Staudinger, Exot. Tagf. I, 291, II, pl. 98, 1888. Venezuela.

*Telegonus hahneli* Godman and Salvin, Biol. Cent.-Am., Rhop. II, 306, pl. 77, fig. 13, 14, 1893.

Skinner, Ent. News XII, 171, 1901.

Draudt, Seitz's Macrolep. V, 863, 167 b, c, 1917.

Staudinger's figure does not agree at all with that of Godman and Salvin, which represents the species recorded from North America. Since the latter authors state, however, that they had specimens from Dr. Staudinger himself, it remains for the identity of the species to be settled by an examination or the type.

The collection of the Philadelphia Academy contains a specimen from Peru which is apparently true *hahneli*. The Jamaican specimens identified by Dr. Skinner, mentioned in the first edition of this paper, have been placed by Williams as *jariba* form *jamaicensis* Williams. We are unable to give authentic records from North America, although Dr. Skinner listed *hahneli* from Arizona.

## Genus **Zestusa** Lindsey

Diatype *Plestia staudingeri* Mabille

‡ *Plestia* Mabille, Le Nat. (2), II, 146, 1888. Haplotype *Plestia staudingeri* Mabille. Preoccupied by *Plestia* Stal, Hemiptera, 1871.

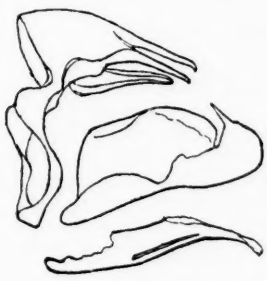


Fig. 1.

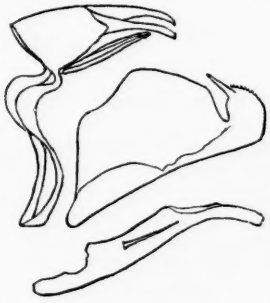


Fig. 2.

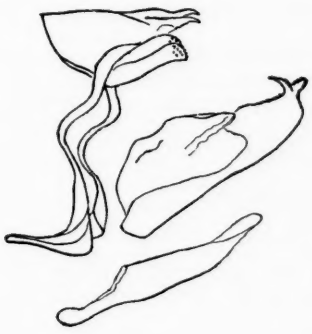


Fig. 3.

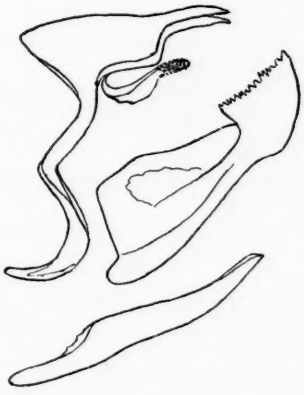


Fig. 4.

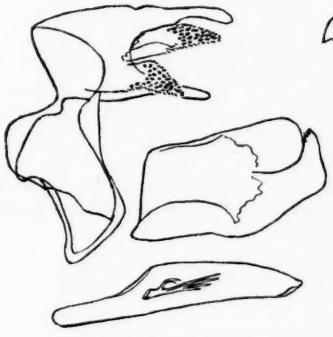


Fig. 5.

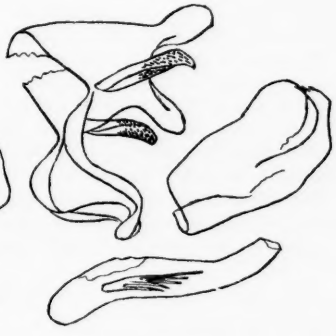


Fig. 6.



PLATE IV. MALE GENITALIA

Fig. I. *Goniurus simplicius*. Fig. 2. *G. eurycles*. Fig. 3. *Chioides albofasciatus*. Fig. 4. *C. zilpa*. Fig. 5. *Codatractus alcaeus*. Fig. 6. *C. melon arizonensis*.

*Zestusa* Lindsey, Ann. Ent. Soc. Am. XVIII, 106, 1925. New name for *Plestia* Mabille.

Palpi porrect, exceeding front by length of head; second joint with shaggy vestiture of scales and hair, third conical, moderately large. Antennae with the club fusiform and pointed, almost as long as shaft. Primaries trigonate, outer margin bent opposite cell; costal fold present in male. Cell over two-thirds as long as wing. Recurrent vein absent. Vein $M_2$ nearer to $M_1$ than to $M_3$. Secondaries trigonate, prominently lobed at anal angle. Legs and under surface of thorax very hairy. Pl. I, fig. 7.

1. **Zestusa dorus** (Edwards). Pl. V, fig. 1.

*Eudamus dorus* Edwards, Papilio II, 140, 1882. Ft. Grant or Graham Mts., Arizona.

*Plestia dorus* Godman and Salvin, Biol. Cent.-Am., Rhop. II, 290, pl. 76, fig. 8, 9, 1893.

Holland, Butterfly Book 322, pl. XLV, fig. 11, 1898.

Draudt, Seitz's Macrolep. V, 859, pl. 172c, 1917.

*Eudamus* (*Plestia*) *dorus* Skinner, Trans. Am. Ent. Soc. XXXVII, 187, 1911.

Arizona, April to July; New Mexico, April and May.

## Genus **Achalarus** Scudder

Orthotype *Papilio lycidas* Abbot and Smith

*Achalarus* Scudder, Rept. Peabody Acad. 1871, 71 (50), 1872.

*Murgaria* Watson, Proc. Zool. Soc. London 37, 1893. Orthotype *Telegonus albociliatus* Mabille.

Palpi porrect; second joint closely and roughly scaled; third small, almost concealed in vestiture of second. Antennae about one-half as long as primaries; club slender, tapering gradually into the reflexed tip, which is not quite as long as the rest of the club. Primaries moderately broad; costa slightly rounded, with or without the fold in the male; outer margin slightly sinuate in the male, more evenly rounded in the female; cell slightly over two-thirds as long as wing; spur vein very faintly indicated, near vein $M_3$; $M_2$ slightly nearer to $M_3$ than to $M_1$. Secondaries angled at 1st A in the male but more rounded in the female. In *casica* this character is variable, some specimens having the angle acute and others obtuse. Vein $M_2$ is not present, as stated by Watson (P.. Z. S. 1893, p. 34) but is indicated by a slight fold.

We continue the association of species which was established in the first edition of this work, but in the intervening years one synonym has been resurrected and the names of two species have been changed.

### Key to the Species

1. Primaries with yellow spots ..... *lyciades*
   Primaries with or without white spots ..... 2
2. Primaries with well-defined whitish hyaline spots ..... *casica*
   Primaries with an obscure dark band, rarely with a few white spots ..... 3

3. Upper surface almost black; spots on under side of secondaries lighter, outlined with a dark shade..... *albociliatus*
Upper surface brown; spots on secondaries below darker than ground color. *coyote*

1. **Achalarus lyciades** (Geyer). Pl. V, fig. 4.

‡ *Papilio lycidas* Abbot and Smith, Lep. Ins. Ga. I, 89, pl. 20, 1797. Georgia.
*Proteides lyciades* Geyer, Zutr. exot. Schmett. IV, 10, fig. 621, 622, 1832. Bahia.
*Achalarus lycidas* Scudder, Butt. E. U. S. II, 1418, 1889.
Holland, Butterfly Book 325, pl. XLV, fig. 10, 1898.
Draudt, Seitz's Macrolep. V, 877, pl. 170d, 1922.
*Achalarus heydsarum* Scudder, Butt. E. U. S. II, 1418, 1889. (Abbot ms.)
*Eudamus* (*Achalarus*) *lycidas* Skinner, Trans. Am. Ent. Soc. XXXVII, 188, 1911.

New York to the Gulf. It has been taken in the northern part of its range from June to August and in the southern part from March to August.

2. **Achalarus casica** (Herrich-Schaeffer). Pl. V, fig. 5.

*Eudamus casica* Herrich-Schaeffer, Corr.-Blatt Regensb. XXIII, 187, 1869.
*Eudamus epigena* Butler, Trans. Ent. Soc. Lond. 493, 1870. Mexico.
*Eudamus orestes* Edwards, (Lintner ms.), Cat. Diurn. Lep. 58, 1877. Texas.
† *Rhabdoides epigona* Godman and Salvin (not Herrich-Schaeffer), Biol. Cent.-Am., Rhop. II, 332, pl. 80, fig. 9–11, 1893.
*Thorybes epigena* Holland, Butterfly Book 325, pl. XLVIII, fig. 13, 1898.
† *Eudamus* (*Rhabdoides*) *epigona* Skinner, Trans. Am. Ent. Soc. XXXVII, 185, 1911.
*Rhabdoides casica* Draudt, Seitz's Macrolep. V, 871, pl. 169b, 1922.
*Achalarus casica* Bell, Jn. N. Y. Ent. Soc. XXIII, 227–232, 1925.

Arizona, May to August; Texas, April and June; Central America.

3. **Achalarus albociliatus** (Mabille). Pl. V, fig. 6.

*Telegonus albociliatus* Mabille, Pet. Nouv. Ent. II, 162, 1877. Colombia.
*Murgaria albociliata* Godman and Salvin, Biol. Cent.-Am., Rhop. II, 333, pl. LXXX, fig. 12–14, 1894.
*Eudamus* (*Murgaria*) *albociliatus* Skinner, Trans. Am. Ent. Soc. XXXVII, 186, 1911.
*Murgaria albociliatus* Draudt, Seitz's Macrolep. V, 875, pl. 170c, 1922.

North American records previously published may be referred with reasonable certainty to the following species, which is one of the two confused forms mentioned in the first edition of this work. We know of no specimens of true *albociliatus* from our region.

4. **Achalarus coyote** (Skinner). Pl. V, fig. 7.

*Eudamus coyote* Skinner, Can. Ent. XXIV, 164, 1892. Corpus Christi, Texas.

Texas and Arizona, May to July.

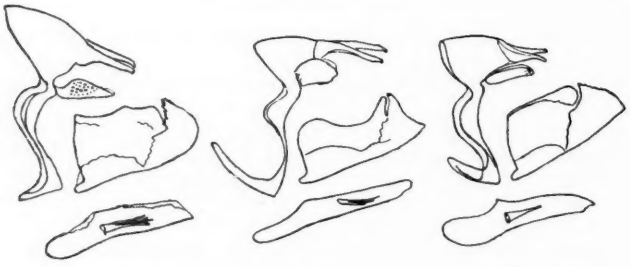


Fig. 1. Fig. 2. Fig. 3.

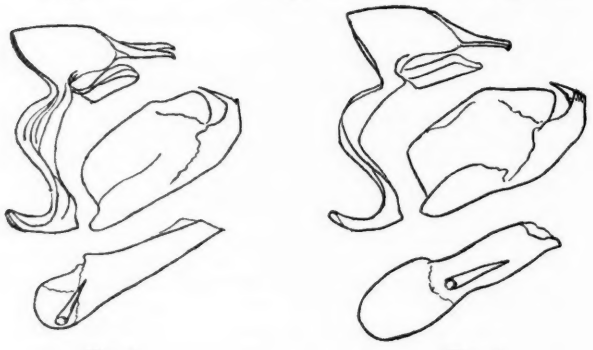


Fig. 4. Fig. 5.

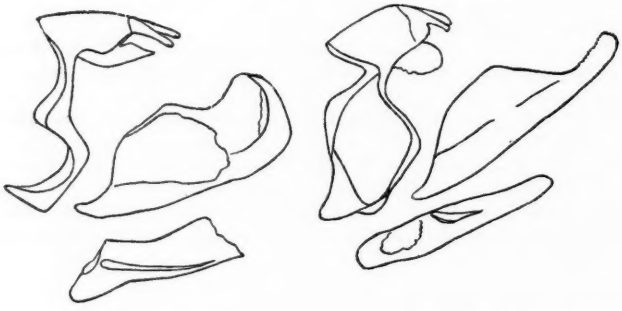


Fig. 6. Fig. 7.



PLATE V. MALE GENITALIA

Fig. 1. *Zestusa dorus*. Fig. 2. *Cecropterus cellus*. Fig. 3. *C. pseudocellus*. Fig. 4. *Achalarus lyciades*. Fig. 5. *A. casica*. Fig. 6. *A. albociliata*. Fig. 7. *A. coyote*.

Genus **Cecropterus** Herrich-Schaeffer

Diatype *Cecrops zarex* Hübner

‡ *Cecrops* Hübner, Zutr. exot. Schmett. t. 32, fig. 183, 184, 1818. Haplotype *Cecrops zarex* Hübner. Preoccupied by *Cecrops* Leach, Crustacea, 1813.

*Cecropterus* Herrich-Schaeffer, Corr.-Blatt Regensb. XXIII, 131, 1869. New name for *Cecrops* Hübner.

*Rhabdoides* Scudder, Butt. E. U. S. III, p. 1854, 1889. Haplotype *Eudamus cellus* Boisduval and LeConte.

Palpi larger than those of *Achalarus*; second joint oblique, roughly scaled; third porrect, moderate, not concealed by vestiture of second. Antennae about one-half as long as primaries; club slender, tapering, bent near middle, with the apiculus scarcely more slender than the basal portion. Primaries similar to *Achalarus* female and *Thorybes*; cell slightly over two-thirds as long as wing; recurrent vein faint but indicated at base of $M_3$; $M_2$ slightly nearer to $M_3$ than to $M_1$; discocellulars less oblique than in *Achalarus*, more as in *Thorybes*; costal fold not present in the male. Outer margin of secondaries rounded, apex broadly rounded; vein 1st A about two-thirds as long as 3rd A. Pl. I, fig. 10.

*Cellus* resembles *Thorybes* closely in most of its structures but seems to belong with this assemblage of species. The banded primaries give the group a close superficial resemblance and distinguish them from other species of our fauna.

1. **Cecropterus cellus** (Boisduval and LeConte). Pl. V, fig. 2.

*Eudamus cellus* Boisduval and LeConte, Lep. Am. Sept. 73, 1833. North America; Mexico.

*Cecrops festus* Geyer, Zutr. exot. Schmett. V, 21, fig. 907, 908, 1837.

*Rhabdoides cellus* Scudder, Butt. E. U. S. II, p. 1855, 1889.

Godman and Salvin, Biol. Cent.-Am. Rhop. II, 331, pl. 80, fig. 8, (♂ gen.), 1894.

Draudt, Seitz's Macrolep. V, 871, pl. 169a, b, 1922.

*Achalarus cellus* Holland, Butterfly Book 326, pl. XLV, fig. 12, 1898.

*Eudamus* (*Rhabdoides*) *cellus* Skinner, Trans. Am. Ent. Soc. XXXVII, 189, 1911.

Pennsylvania, July. Virginia and West Virginia, May to August. Texas and Arizona, April, July to September.

1a. ab. **aereofuscus** Gunder.

*Rhabdoides cellus* ab. ♂ *aereofuscus* Gunder, Ent. News XXXVI, 196, fig. 6, 1925. Baboquivari Mts., Arizona.

The type male was taken in July. It is described as normal in markings but with a bronze-brown ground color in place of the usual very dark brown.

2. **Cecropterus pseudocellus** (Coolidge and Clemence). Pl. V, fig. 3.

*Achalarus pseudocellus* Coolidge and Clemence, Ent. News XXII, 3, 1911. Cochise Co., Ariz.

*Eudamus* (*Rhabdoides*) *pseudocellus* Skinner, Trans. Am. Ent. Soc. XXXVII, 190, 1911.

Arizona, June to September. The types were taken in Ramsey Canyon in the Huachuca Mts., 5000 to 7000 ft.

This species is smaller and darker than *cellus*, lacks the terminal pale area on the under surface of the secondaries, and has a pale ring at the base of the antennal club. We have examined many specimens without finding any which lacked the pale ring.

## Genus **Thorybes** Scudder

Orthotype *Papilio bathyllus* Abbot and Smith

*Thorybes* Scudder, Rept. Peabody Acad. 1871, 71 (50), 1872.
*Cocceius* Godman and Salvin, Biol. Cent.-Am., Rhop. II, 336, 1900. Orthotype *Eudamus pylades* Scudder.

Palpi with the second joint appressed, densely scaled; third small, porrect, partly concealed by scales of second. Club of antennae moderate, tapering into a slender apiculus which is slightly shorter than the rest of the club. In specimens the apiculus varies from sharply reflexed to slightly recurved. Primaries rather short and broad with the costa and outer margin convex; cell slightly over two-thirds as long as wing; recurrent vein barely indicated near vein $M_3$; $M_2$ equidistant between $M_1$ and $M_3$; $Cu_2$ nearer base of wing than to $Cu_1$. Secondaries broadly rounded, length along vein $M_1$ about equal to or somewhat greater than along 1st A; anal angle sometimes slightly prominent. Costal fold present in *pylades* and *drusius* but not in the other species. Pl. VIII, fig. 7.

### Key to the Species

1. Fringe of secondaries white, at least in the middle of the outer margin . . . *drusius*
   Fringes not white . . . 2
2. Under surface of secondaries transversely strigate . . . 3
   Under surface not clearly strigate . . . 5
3. Hyaline spots large, with dark outlines; ground color paler than the dark outlines . . . *nevada*
   Hyaline spots moderate to small, not conspicuously outlined; ground color dark . . . 4
4. A southeastern species, much like *pylades* and *bathyllus* but accurately separated by the genitalia . . . *confusis*
   A southwestern species . . . *mexicana*
5. Spots usually large, extending from vein to vein; palpi usually pale below; male without costal fold . . . *bathyllus*
   Spots usually small or moderate . . . 6
   Spots absent . . . *pylades* ab. *immaculatus*
6. Spot between $Cu_1$ and $Cu_2$ small and rounded; bands on under surface of secondaries broad and distinct; male with costal fold . . . *pylades*
   Spot elongate; bands narrow and indistinct; costal fold lacking . . . *diversus*

1. **Thorybes drusius** (Edwards).
   *Eudamus drusius* Edwards, Can. Ent. XV, 211, 1883. Arizona.
   *Cocceius drusius* Godman and Salvin, Biol. Cent.-Am., Rhop. II, 336, 1894. Draudt, Seitz's Macrolep, V, 880, 1922.

*Eudamus* (*Cocceius*) *drusius* Skinner, Trans. Am. Ent. Soc. XXXVII, 185, pl. X, 1911.

Arizona, June to August; Texas, April; Mexico.

2. **Thorybes bathyllus** (Abbot and Smith). Pl. VI, fig. 2.

*Papilio bathyllus* Abbot and Smith, Lep. Ins. Ga. I, 43, pl. XXII, 1797. Georgia.

*Thorybes bathyllus* Scudder, Butt. E. U. S. II, p. 1732, 1889.

Holland, Butterfly Book 325, pl. XLVIII, fig. 5; pl. II, fig. 32; pl. VI, fig. 24, 1898.

*Eudamus* (*Thorybes*) *bathyllus* Skinner, Trans. Am. Ent. Soc. XXXVII, 178, 1911.

† *Papilio daunus* Draudt, (not Cramer), Seitz's Macrolep V, 880, pl. 171b, 1922.

Some females of *pylades* and *bathyllus* are difficult to separate but as a rule the size of the spots and color of the palpi in this species are characteristic. We feel that the use of *daunus* Cramer for this species, as adopted by several writers, is not adequately supported. Cramer's figure is a very poor likeness of any species of the genus.

*Bathyllus* is common in the eastern United States, occurring from Florida to Massachusetts and west to the Mississippi. It flies from March to September in the south and in May and June in the north.

3. **Thorybes confusis** Bell. Pl. VI, fig. 5.

*Cogia* (*Thorybes*) species Skinner and Williams, Trans. Am. Ent. Soc. XLVIII, 124, fig. 29, (male gen.), 1922.

*Thorybes confusis* Bell, Trans. Am. Ent. Soc. XLVIII, 205, 1923. Tampa, Florida.

*Confusis* is much like *bathyllus* and *pylades* in superficial appearence and some female specimens are difficult to separate. There are, however, dependable differences which can be traced through good series. It is best to examine the genitalia for accurate identification of the species.

Florida to Texas, February to October; Arkansas, May, July; Maryland, July, August.

4. **Thorybes pylades** (Scudder). Pl. VI, fig. 1.

† *Eudamus bathyllus* Harris (not A. & S.), Ins. Inj. Veg. 3rd Ed., 312, 1862.

*Eudamus pylades* Scudder, Proc. Bost. Soc. Nat. Hist. XIII, 207, 1870.

Wright, Butt. West Coast 254, pl. XXXII, fig. 471, 1905.

*Thorybes pylades* Scudder, Butt. E. U. S. II, 1436, 1889.

Holland, Butterfly Book 324, pl. II, fig. 25, 29; pl. VI, fig. 28; pl. XLVIII, fig. 6, 1898.

*Cocceius pylades* Godman and Salvin, Biol. Cent.-Am., Rhop. II, 336, pl. 80, fig. 23, 1894.

Draudt, Seitz's Macrolep. V, 880, pl. 171b 1922.

† *Eudamus mexicana* Wright (not H.-S.), Butt. West Coast 254, pl. XXXII, fig. 472, 1905.

*Eudamus* (*Cocceius*) *pylades* Skinner, Trans. Am. Ent. Soc. XXXVII, 176, 1911.

Occurs throughout the United States and most of Canada. In Florida and Texas it has been taken as early as March and as late as October; farther north it flies from May to August.

4a. ab. **immaculata** Skinner.

*Eudamus pylades* var. *immaculata* Skinner, Trans. Am. Ent. Soc. XXXVII, 177, 1911. Pennsylvania.

This is a rather uncommon form in which the hyaline spots of the primaries are entirely absent.

5. **Thorybes diversus** Bell. Pl. XXV, fig. 5.

*Thorybes diversus* Bell, Bull. Brook. Ent. Soc. XXII, 217, 1927. Plumas County, Cal.

This species was originally compared with *nevada*, from which it differs in the larger size (38–40 mm.), darker fringes, tendency to warmer brown color, and lack of strigation on the outer half of the secondaries below. The type series contained specimens from Colorado and Wyoming, as well as from California. The California specimens were taken late in May and early in June, while those from the other states were caught in July.

6. **Thorybes nevada** Scudder. Pl. VI, fig. 4.

*Thorybes nevada* Scudder, Rept. Peabody Acad. 1871, 71 (50), 1872. California.

Comstock, Butt. Cal. 206, pl. 58, fig. 3–5, 1927.

*Eudamus aemilea* Skinner, Ent. News IV, 64, 1893. Ft. Klamath, Oregon.

*Thorybes aemilia* Holland, Butterfly Book 325, pl. XLVI, fig. 39, 1898.

*Eudamus aemilia* Wright, Butt. W. Coast 254, pl. XXXII, fig. 478, 1905.

*Eudamus* (*Thorybes*) *aemilea* Skinner, Trans. Am. Ent. Soc. XXXVII, 182, 1911.

Ground color rather pale, with a fine terminal line and margins of spots darker. Spots large. Strigation on under surface usually heavy.

California and Oregon, June to August, 8000 ft. Utah, July.

7. **Thorybes mexicana** (Herrich-Schaeffer). Pl. VI, fig. 3.

*Eudamus mexicana* Herrich-Schaeffer, Corr.-Blatt Regensb. XXIII, 188, 1869.

*Eudamus ananius* Plötz, Stett. ent. Zeit. XLIII, 99, 1882.

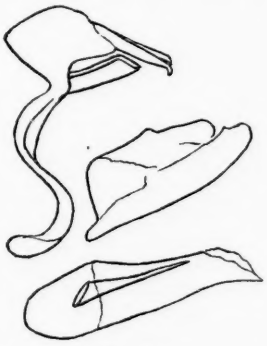
*Thorybes mexicanus* Godman and Salvin, Biol. Cent.-Am., Rhop. II, 334, pl. 80, fig. 15–17, 1894.

Draudt, Seitz's Macrolep. V, 880, pl. 171b, 1922.

*Eudamus* (*Thorybes*) *mexicanus* Skinner, Trans. Am. Ent. Soc. XXXVII, 180, 1911.

*Thorybes mexicana* Comstock, Butt. Cal. 206, pl. 58, fig. 1, 2, 1927.

Skinner and Williams' figure of the genitalia was made from a specimen taken at Uruapam, Mexico. Williams has associated with the Mexican material specimens from Tucson and Mt. Graham, Arizona, the former taken in April and May.



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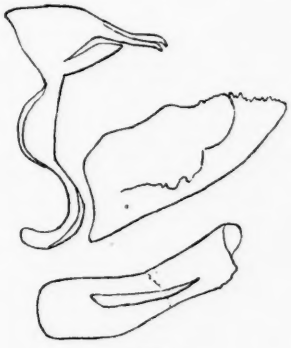

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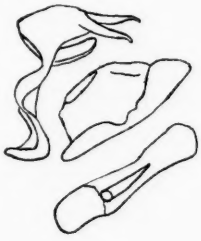
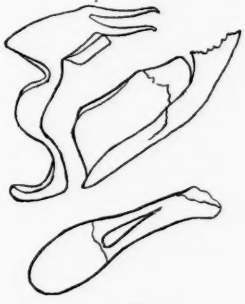


Fig. 3.



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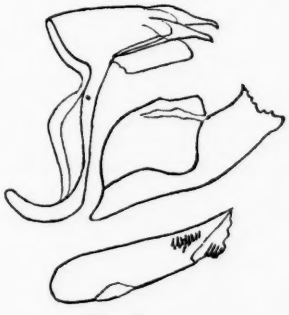


Fig. 5.

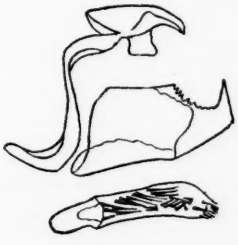


Fig. 6.



PLATE VI. MALE GENITALIA

Fig. 1. *Thorybes pylades.* Fig. 2. *T. bathyllus.* Fig. 3. *T. mexicana.* Fig. 4. *T. nevada.* Fig. 5. *T. confusis.* Fig. 6. *Cogia calchas.*

Genus **Cabares** Godman and Salvin

Orthotype *Thanaos potrillo* Lucas

*Cabares* Godman and Salvin, Biol. Cent.-Am., Rhop. II, 337, 1894.

"Antennae with a gradually tapering club, curved in the middle into a crook. Palpi porrect, the third joint rather prominent. Primaries with the cell more than two-thirds the length of the costa, the second, third, and fourth subcostal segments subequal; lower discocellular rather shorter than the middle, the two forming an oblique line at a large acute angle to the axis of the wing; third median segment less than half the second, and rather shorter than the first; a curved recurrent nervule starts from the end of the cell. Secondaries with the discocellulars very slender; third median segment very short; second subcostal segment also short. Primaries short, slightly truncate at the tip; no costal fold in the male; secondaries with a projection in the middle of the outer margin from the end of the median nervure. Hind tibiae with two pairs of spurs." (Original description.)

The peculiar short lobe on the outer margin of the secondaries readily places the genus among all North American Hesperioidea. Pl. VIII, fig. 7.

1. **Cabares potrillo** (Lucas). Pl. VII, fig. 4.

*Thanaos potrillo* Lucas, Sagra's Hist. Cuba VII, 641, 1857. Cuba.

*Cabares potrillo* Godman and Salvin, Biol. Cent.-Am., Rhop. II, 337, pl. 80, fig. 24–26, 1894.

Draudt, Seitz's Macrolep. V, 878, pl. 170f, 1922.

This species is occasionally taken in Texas, in May. It is more common in Central America.

Genus **Cogia** Butler

Haplotype *Cogia hassan* Butler

*Cogia* Butler, Trans. Ent. Soc. London 508, 1870.

Palpi porrect; second joint heavily clothed with scales; third small but not concealed. Antennae about one-half as long as primaries; club moderately thick, tapering into the short, reflexed apiculus. The apiculus is about half as long as the rest of the club and is usually bent at about a right angle. Shape of wings similar to *Thorybes* but costa of primaries less strongly curved and secondaries a little more produced anally. Cell of primaries about two-thirds as long as wingr vein $M_2$ intermediate between $M_1$ and $M_3$; recurrent vein faintly indicated, neare; to $M_3$ than to $Cu_1$. Primaries of male without costal fold but secondaries with a short tuft of scales lying in the fold along vein 1st A near the base of the wing. Pl. VIII, fig. 7.

KEY TO THE SPECIES

1. Fringes fuscous ..... 2
   Fringes white ..... *hippalus*
2. Subapical spots indistinct; those between veins $Cu_2$ and $M_3$ usually lacking; color dark ..... *calchas*
   Subapical spots clearer; those between $Cu_2$ and $M_3$ usually present; color pale fuscous ..... *outis*

1. **Cogia calchas** (Herrich-Schaeffer). Pl. VI, fig. 6.
   *Eudamus calchas* Herrich-Schaeffer, Corr.-Blatt Regensb. XXIII, 188, 1869.
   *Spathilepia terranea* Butler, Lep. Exot. 111, pl. XL, fig. 8, 1872. Cartago, Costa Rica.
   *Eudamus anacreon* Plötz, Stett. ent. Zeit. XLIII, 99, 1882.
   *Cogia calchas* Godman and Salvin, Biol. Cent.-Am., Rhop. II, 340, pl. 81, fig. 6 (male gen.), 1894.
   Draudt, Seitz's Macrolep. V, 877, pl. 170e, 1922.

   Texas; May, October, and November. South to Paraguay. Most specimens can be distinguished from *outis* by the dark color and limited maculation.

2. **Cogia outis** (Skinner). Pl. VII, fig. 1.
   *Eudamus outis* Skinner, Ent. News V, 332, 1894. Round Mt., Blanco Co., Texas.
   *Eudamus* (*Cogia*) *outis* Skinner, Trans. Am. Ent. Soc. XXXVII, 184, pl. X, 1911.

   Texas, April and August.

   The ground color is pale fuscous, as in *hippalus*. The primaries usually have the two hyaline spots between veins $Cu_2$ and $M_3$ but in some specimens they are lacking or greatly reduced.

3. **Cogia hippalus** (Edwards). Pl. VII, fig. 2.
   *Eudamus hippalus* Edwards, Papilio II, 27, 1882. Tucson and Prescott, Arizona.
   *Hesperia gila* Plötz, Stett. ent. Zeit. XLVII, 91, 1886. Arizona.
   *Cogia hippalus* Godman and Salvin, Biol. Cent.-Am., Rhop. II, 340, pl. 80, fig. 29–31, 1894.
   Draudt, Seitz's Macrolep. V, 877, pl. 170e, 1922.
   *Eudamus* (*Cogia*) *hippalus* Skinner, Trans. Am. Ent. Soc. XXXVII, 184, 1911.

   Southern Arizona, New Mexico, and Texas, June to August. Mexico.

## Genus **Phoedinus** Godman and Salvin

Logotype *Eudamus caicus* Herrich-Schaeffer

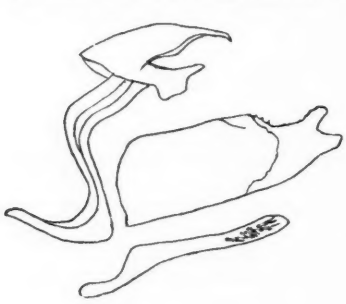
*Phoedinus* Godman and Salvin, Biol. Cent.-Am., Rhop. II, 335, 1894.

The large palpi with their conspicuous third joint serve to distinguish this genus easily from *Cogia*. The spur vein is very faintly indicated near vein $M_3$. There are no secondary sexual structures in the male.

1. **Phoedinus mysie** (Dyar).
   *Thorybes mysie* Dyar, Jn. N. Y. Ent. Soc. XII, 40, 1904. Patagonia Mts., Arizona.
   *Eudamus* (*Phoedinus*) *mysie* Skinner, Trans. Am. Ent. Soc. XXXVII, 181, 1911.

   We do not know this species.

2. **Phoedinus caicus** (Herrich-Schaeffer). Pl. VII, fig. 3.
   *Eudamus caicus* Herrich-Schaeffer, Corr.-Blatt Regensb. XXIII, 188, 1869.



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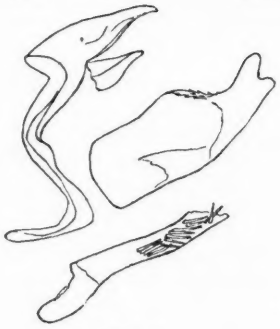

Fig. 2.

Fig. 3.

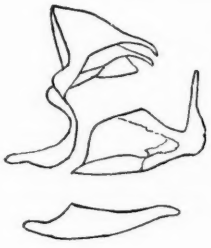

Fig. 4.

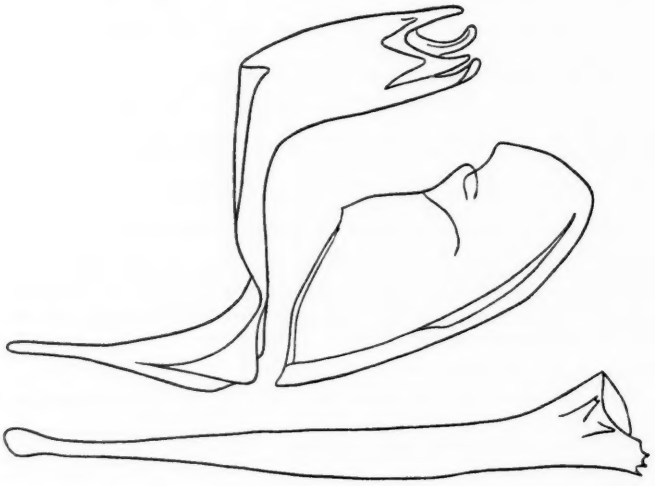

Fig. 5.



PLATE VII. MALE GENITALIA

Fig. 1. *Cogia outis*. Fig. 2. *C. hippalus*. Fig. 3. *Phoedinus caicus*. Fig. 4. *Cabares potrillo*. Fig. 5. *Atrytonopsis lunus*.

*Eudamus schaefferi* Plötz, Stett. ent. Zeit. XLIII, 99, 1882.
*Eudamus moschus* Edwards, Papilio II, 141, 1882. Arizona.
*Phoedinus caicus* Godman and Salvin, Biol. Cent.-Am., Rhop. II, 335, pl. 80, fig. 18–20, 1894.
Draudt, Seitz's Macrolep. V, 880, pl. 171c, 1922.
*Eudamus* (*Phoedinus*) *caicus* Skinner, Trans. Am. Ent. Soc. XXXVII, 183, 1911.

Arizona, March to August.

The fringes of the secondaries of this species are pure white, save at the apex and anal angle.

## GROUP B

The second group of the subfamily Pyrginae is distinguished from the first by the short cell of the primaries, the form of the antennal club, and the palpi. The cell is never over two-thirds of the length of the wing and is usually less. The antennal club is ovate or fusiform, usually somewhat flattened and more or less curved, but never bent as in most of the genera of Group A and never with a distinct apiculus. The palpi are porrect or oblique, either large or with hairy vestiture or both. The only similar palpi in Group A are found in the genus *Plestia*.

The genera of this group appear to be poorly defined, owing to the structural variation of the species. If we split to the extent advocated by some lepidopterists we can make a genus for almost every species, so the opposite course, adopted in the first edition of this work, has been continued here with the exception of a few cases. In these cases the gradation of structure which was emphasized in the first edition seems to be a part of the general uniformity of Hesperioid structure rather than a true indication of relationship. We are therefore relying to some extent on less tangible characters than we should like for the separation of genera on whose retention we are unanimously agreed.

### Key to the Genera

1. Secondaries irregular, excavated opposite end of cell and before anal angle, not trigonate. Vein $Cu_2$ of primaries nearer to base of cell than to $Cu_1$....2
   Not such insects....3
2. One species; terminal portion of wings marked with brown dashes....*Celotes*
   One species; colors smoothly blended, no dashes....*Antigonus*
3. Club of antennae long, slender, not distinctly flattened, and rarely more than twice as thick as shaft....4
   Club thicker in at least one direction....5
4. Primaries slightly excavated below apex; humeral angle prominently rounded *Achlyodes*
   Apex rectangular; humeral angle normal....*Xenophanes*
5. Palpi large; third joint conspicuous, its vestiture not roughly hairy *Pholisora*
   Palpi moderate to large; third joint not conspicuous or, if so, with hairy vestiture....6
6. Club of antennae elongate-ovate, flattened, blunt....7
   Club more or less fusiform and pointed....8

7. Upper surface of wings mostly white, or at least with a broad median white band..... *Heliopetes*
   Upper surface checkered with white spots..... *Pyrgus*
8. Outer margin of primaries evenly rounded or nearly so.....9
   Apex of primaries subtruncate or rectangular.....10
9. Vein $R_1$ of primaries arising just beyond middle of cell and reaching costa before end of cell..... *Chiomara*
   Vein $R_1$ arising at or beyond outer third of cell and ending in costa beyond end of cell..... *Erynnis*
10. Anal angle of primaries broadly rounded; outer and inner margins about equal..... *Ephyriades*
    Anal angle sharply rounded; outer margin distinctly shorter than inner.....11
11. Cell narrow, about equal to space between cell and costa..... *Grais*
    Cell normal, much wider than this distance..... *Timochares*

### Genus **Pyrgus** Hübner

Logotype *Papilio syrichtus* Fabricius

† *Hesperia* Auct., not Fabricius, 1793.
*Pyrgus* Hübner, Verz. bek. Schmett. 109, 1820.
*Syrichtus* Boisduval, Icones 230, 1833. Logotype *Papilio sao* Bergst.
*Scelothrix* Rambur, Cat. Lep. And. I, 63, 1858. Logotype *Papilio carthami* Hübner.
*Muschampia* Tutt, Brit. Butt. I, 218, 1906. Orthotype *Papilio proto* Esper.
*Sloperia* Tutt, op. cit. I, 218, 1906. Orthotype *Hesperia poggei* Lederer.
*Powellia* Tutt, op. cit. I, 218, 1906. Orthotype *Papilio sao* Bergst.
*Favria* Tutt, op. cit. I, 218, 1906. Orthotype *Hesperia cribrellum* Eversman.
*Bremeria* Tutt, op. cit. I, 296, 1906. Orthotype *Syrichtus bieti* Oberthur.

Palpi porrect; second joint with shaggy vestiture in some species, smooth in others, and of mixed scales and hair. Antennae slightly less than one-half as long as primaries; club elongate oval, flattened, blunt. Costa of primaries more or less flattened; outer margin rounded, sometimes evenly and sometimes more strongly toward the apex. Cell less than two-thirds as long as wing; vein $M_2$

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PLATE VIII

Fig. 1. Details of neuration at end of cell of primary: a. *C. zilpa*; b. *C. alcaeus*. Antennal clubs: c. *C. zilpa;* d. *C. alcaeus*. e. Palpus of *C. zilpa*. Fig. 2. *Ephyriades zephodes*, a. club of antenna; b. outlines of wings. Fig. 3. *Butleria pirus*, a. club of antenna; b. hind tibia; c. neuration. d. *Pamphilida palaemon*, hind tibia. Fig. 4. Neuration of *Systasea pulverulenta*. Fig. 5. *Pholisora*. Palpi, inner outline showing joints and outer showing extent of vestiture: a. *alpheus*, b. *libya*, c. *catullus*, d. *ceos*, e. *hayhurstii*. Antennal clubs: f. *libya*, g. *catullus*, h. *ceos*, i. *hayhurstii*. j. Neuration of *hayhurstii*. k. Outer margins of wings of *ceos*; l. same, of *catullus*. Fig. 6. *Achlyodes thraso*, a. club of antennae; b. neuration. Fig. 7. a. Antennal club of *Cogia hippalus*. b. Neuration of *Thorybes pylades*. c. Truncate lobe on secondary of *Cabares potrillo*. Fig. 8. *Xenophanes tryxus*, a. club of antenna; b. neuration.

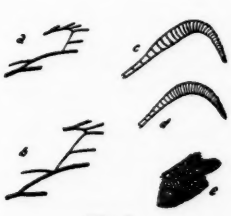
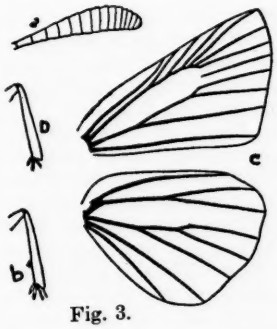


Fig.1.

Fig. 2.



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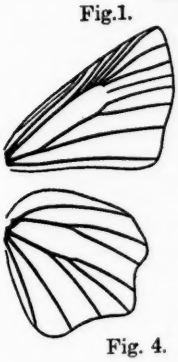

Fig. 4.

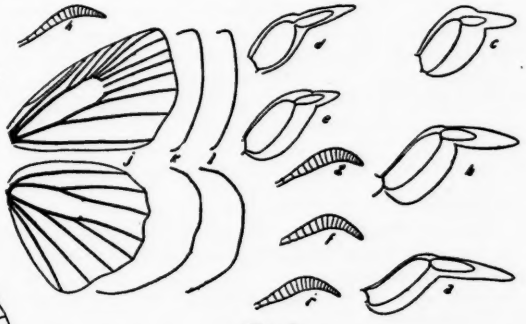

Fig. 5.

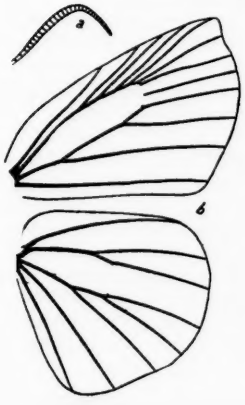

Fig. 6.

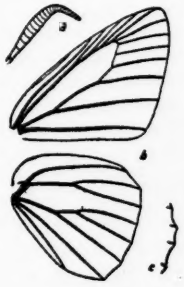

Fig. 7.

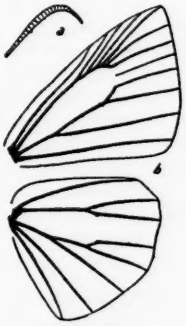

Fig. 8.

slightly nearer to $M_1$ than to $M_3$; position of $Cu_1$ and $Cu_2$ very variable. Secondaries broadly rounded with a slight indication of an anal lobe, to subtrigonate with the outer margin slightly wavy. Secondary sexual characters of males the costal fold, tibial tuft, and abdominal lobes; one or more of these characters may be lacking. Pl. I, fig. 2.

The North American species were long placed in three genera, based chiefly on secondary sexual characters. Barnes and McDunnough made a step in advance by avoiding these characters (Contributions III, pp. 121–2). They say: "A better means of separation of *Pyrgus* (including *syrichtus*, *montivaga*, and *philetas*) from *Hesperia* (*Scelothrix*) than that given by Dyar, and one that would include both sexes appears to be found in the palpi; in *Pyrgus* they are only slightly upturned and the clothing under a strong lens is seen to be rather even and composed largely of scales with a few hairs of equal length interminglied; in *Hesperia* the palpi are strongly upturned and very heavily and roughly clothed underneath with long hairs, the scales being confined to the lateral basal portion."

It is quite true that this distinction furnishes a good basis for the separation of our species and the general habitus of each group is also distinctive, but some of the South American species have the habitus of *Hesperia* (as used by Barnes and McDunnough) and the palpi of *Pyrgus*. It seems that the only sound course is the one followed in the first edition of this paper, where all of the species were included in a single genus.

### Key to the Species

1. Spots of primaries subquadrate, well separated.....2
   Spots crowded, slender; with an additional row of spots beyond cell.....5
2. Primaries with a triangular white spot in the angle of vein $Cu_2$ and the cell....3
   This spot absent.....*centaureae*
3. Male with fold; subterminal spots on under surface of secondaries deeply crescentic in most specimens, even when reduced in size.....*ruralis*
   Male without fold; subterminal spots never deeply crescentic, usually poorly defined.....4
4. Under surface of secondaries without distinct contrasts, whitish; markings of upper surface usually reduced; a pale, glossy species.....*scriptura*
   Under surface with contrasting markings; upper surface with maculation rarely reduced; darker insects.....*xanthus*
5. Under surface of secondaries with two small submarginal lunules between veins $M_1$ and $M_3$.....6
   These vague, fused with a marginal white patch or with each other..*communis*
6. Under surface of secondaries very pale, without sharp contrasts.....*philetas*
   Maculation of under surface contrasting; under surface often powdered with brown scales.....*syrichtus*

1. **Pyrgus centaureae** (Rambur). Pl. IX, fig. 1.

   *Hesperia centaureae* Rambur, Faun. Ent. Andal. II, 315, pl. 8, fig. 10, 1840. Andalusia.

   Scudder, Butt. E. U. S. II, p. 1542, 1889.

   Holland, Butterfly Book 327, pl. XLVII, fig. 13, 1898.

   Reverdin, Oberthür's Etudes Lep. Comp. XII, 21, pl. 402, fig. 5023 (male gen.), 1916.

*Hesperia wyandot* Edwards, Proc. Ent. Soc. Phil. II, 21, pl. 5, fig. 4, 1863. Long Island and Washington, D. C.

*Hesperia freija* Warren, Trans. Ent. Soc. London 56, 1924. Labrador, ♂; Lapland, ♀.

A circumpolar species. Labrador, June and July; Ontario, May to July. New Jersey and Virginia, April and May; North Carolina, April. Colorado, June to August; 13,000 ft.

The male has both a costal fold and tibial tufts.

2. **Pyrgus ruralis** (Boisduval). Pl. IX, fig. 2.

*Syrichtus ruralis* Boisduval, Ann. Soc. Ent. France (2), X, 311, 1852. California.

Oberthür, Etudes Lep. Comp. VI, 339, pl. 137, fig. 1205, 1212, 1912. (Type)

*Syrichtus caespitalis* Boisduval, op. cit. 312, 1852. California.

Oberthür, op. cit. fig. 1204. (Type).

*Hesperia ricara* Edwards, Proc. Ent. Soc. Phil. IV, 203, pl. I, fig. 2, 1865. Empire City, Colorado.

*Syrichtus petreius* Edwards, Trans. Am. Ent. Soc. III, 195, 1870. Nevada.

*Hesperia caespitalis* Holland, Butterfly Book 328, pl. XLVII, fig. 14, 1898. Draudt, Seitz's Macrolep. V, 919, pl. 178k, 1923.

*Pyrgus caespitalis* Wright, Butt. W. Coast 251, pl. XXXI, fig. 458b, c, 1905.

*Urbanus ruralis* Comstock, Butt. Cal. 206, pl. 58, fig. 6–8, 1927.

Western North America from Texas to Alberta, April to August.

A smaller and darker species than the preceding. The male has both fold and tufts.

3. **Pyrgus xanthus** Edwards. Pl. IX, fig. 3.

*Pyrgus xanthus* Edwards, Field and Forest III, 142, 1878. Colorado.

*Hesperia xanthus* Holland, Butterfly Book 328, pl. XLVII, fig. 15, 1898. Draudt, Seitz's Macrolep. V, 919, pl. 179a, 1923.

*Syrichthus macdunnoughi* Oberthür, Etudes Lep. Comp. IX, (2), 86, pl. 264, fig. 2205, 1913. Arizona.

*Hesperia macdunnoughi* Barnes and McDunnough, Contributions III, (2), 122, pl. X, fig. 14, 1916.

Colorado, July; Arizona and New Mexico, May.

*Xanthus* resembles *ruralis* very closely but most specimens have the subterminal maculation of the secondaries poorly defined and reduced as noted in the key, and the males lack the costal fold. The series of four specimens of *macdunnoughi* in the Barnes collection fails to justify the retention of the species.

4. **Pyrgus scriptura** (Boisduval). Pl. IX, fig. 4.

*Syrichtus scriptura* Boisduval, Ann. Soc. Ent. France (2), X, 312, 1852. California.

Oberthür, Etudes Lep. Comp. VI, 339, pl. 137, fig. 1206, 1207, 1912. (Type: fig. 1206).

*Hesperia scriptura* Holland, Butterfly Book 328, pl. XLVII, fig. 12, 1898. Draudt, Seitz's Macrolep. V, 918, pl. 178k, 1923.

*Pyrgus scriptura* Wright, Butt. W. Coast 251, pl. XXXI, fig. 459, 1905.

*Urbanus scriptura* Comstock, Butt. Cal. 207, pl. 58, fig. 9–11, 1927.

Wyoming, July and August, to California, Arizona, and New Mexico, April to August.

This species is readily distinguished by the color of the under surface, its glossy appearance, and as a rule by the reduced maculation of the secondaries. As in the two preceding, the male has tibial tufts but no costal fold.

5. **Pyrgus syrichtus** (Fabricius). Pl. IX, fig. 6.

*Papilio syrichtus* Fabricius, Syst. Ent. 534, 1775. America.

*Hesperia syrichtus* Draudt, Seitz's Macrolep. V, 918, pl. 178k, 1923.

Williams and Bell, Trans. Am. Ent. Soc. LVI, 133, pl. VIII, 1930.

Texas, Central America, and the West Indies. We have records of its occurrence in Texas in February, April, May, and November.

True *syrichtus* has the under surface of the secondaries clear whitish with sharply defined dark markings, and lacks the brown overscaling which characterizes the form *montivagus*. The male has both the costal fold and tibial tuft.

Draudt's figure of the under surface is a very poor likeness of the form *montivagus* or, more likely, another species.

5a. form **montivagus** Reakirt.

*Pyrgus montivagus* Reakirt, Proc. Acad. Nat. Sci. Phil. 334, 1866. Rocky Mountains, Colorado Terr.

Skinner, Ent. News XVII, 277 pl. XII, 1906.

*Hesperia syrichtus* var. *fumosus* Reverdin, Bull. Soc. Lep. Geneve IV, 106, pl. LV, fig. 2, 1919.

The form also occurs in the West Indies and has been taken in North America only in Florida and Texas. We have seen it from Florida taken in March, June, July, and October, and from Texas taken in January, February, April, and November.

The secondaries of this form are heavily powdered with rusty brown scales below.

6. **Pyrgus philetas** Edwards. Pl. IX, fig. 5.

*Pyrgus philetas* Edwards, Papilio I, 46, 1881. Western Texas.

Arizona to Texas, May to October.

7. **Pyrgus communis** (Grote). Pl. X, fig. 1.

‡ *Hesperia tessellata* Scudder, Rept. Peabody Acad. 1871, 73 (52), 1872. Preoccupied by *Hesperia tessellata* Hewitson, 1866.

Reverdin, Bull. Soc. Lep. Geneve IV, 168, fig. 1-5, pl. VI, VII, 1921.

*Syrichthus communis* Grote, Can. Ent. IV, 69, 1872. Central Alabama.

*Hesperia albovittata* Grote, Bull. Buff. Soc. Nat. Hist. I, 168, 1873.

† *Hesperia montivaga* Scudder (not Reakirt), Butt. E. U. S. II, p. 1536, 1889.

Holland, Butterfly Book 327, pl. XLVII, fig. 18, 1898.

Draudt, Seitz's Macrolep. V, 919, pl. 178k, 1923.

† *Hesperia centaureae* Comstock (not Rambur), How to Know the Butterflies 301, pl. XLV, fig. 8, 1904.

*Pyrgus tessellata* Wright, Butt. W. Coast 250, pl. XXXI, fig. 457, 1905.

Occurs from coast to coast and from Northern Canada to Mexico, March to October.

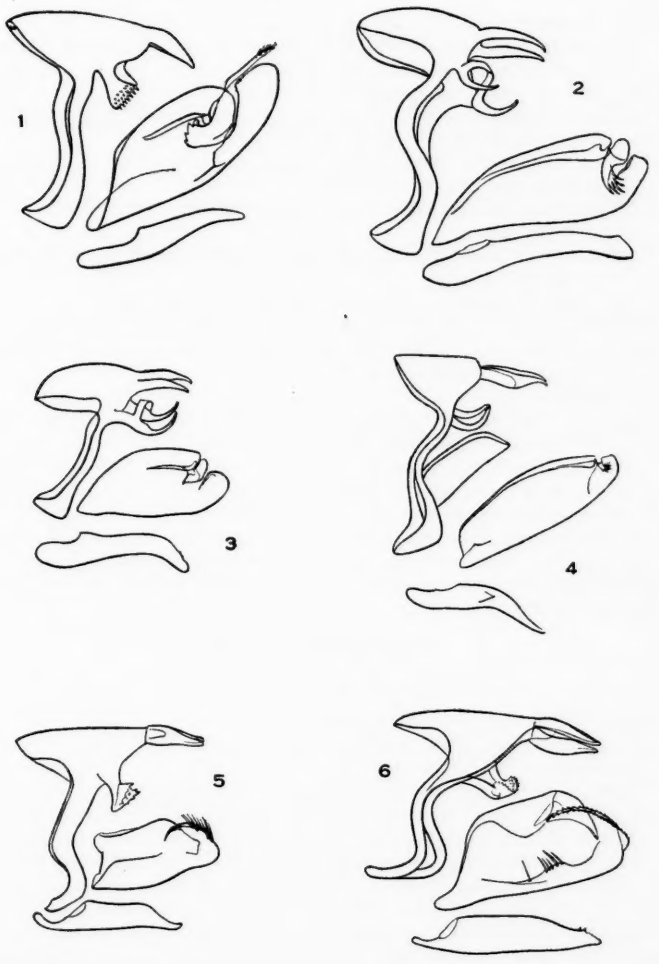




PLATE IX. MALE GENITALIA OF *Pyrgus*

Fig. 1. *centaureae*. Fig. 2. *ruralis*. Fig. 3. *xanthus*. Fig. 4. *scriptura*. Fig. 5. *philetas*. Fig. 6. *syrichtus*.

7a. race, **albescens** Plötz. Pl. X, fig. 8.

*Pyrgus albescens* Plötz, Mitth. Nat. Ver. Vorpomm. XV, 4, 1884. Mexico.

*Pyrgus adjutrix* Id., op. cit. p. 15. Mexico.

*Syrichtus varus* Id., op. cit. p. 20. Mexico.

† *Hesperia montivaga* Godman and Salvin (not Reakirt), Biol. Cent.-Am., Rhop. II, 450, pl. XC, fig. 28–30, 1899.

*Pyrgus occidentalis* Skinner, Ent. News XVII, 96, 1906. Cochise Co., Arizona, and Brownsville, Texas.

*Pyrgus tessellata* form or race *occidentalis* Skinner, Ent. News XVII, 277, pl. XII, 1906.

*Hesperia tessellata occidentalis* Comstock, Butt. Cal. 207, fig. A67, A68; pl. 58, fig. 12, 13, 1927.

From California to Texas and Mexico, March to November.

This form is scarcely worthy of a name, but may be regarded as a pale southwestern geographic race. The white markings are extended and the form is generally paler than typical eastern specimens.

7b. ab. **skinneri** Gunder.

*Urbanus tessellata* var. *occidentalis* ab. female *skinneri* Gunder, Ent. News XXXVIII, 51, fig. 1927. Los Angeles, Cal.

*Urbanus tessellata occidentalis* ab. *skinneri* Comstock, Butt. Cal. 208, pl. 62, fig. 7 (type, female), 1927.

This aberration was described as having the primaries quite melanic, with only an uneven submarginal band of white elongate spots and a few streaks near the end of the cell. The secondaries, however, were said to be more suffused with white than normal individuals, and to have larger white spots on the disk in place of the usual small spots.

## Genus **Heliopetes** Billberg

Haplotype *Papilio arsalte* Linnaeus

*Heliopetes* Billberg, Enum. Ins. 81, 1820.

*Leucoscirtes* Scudder, Rept. Peabody Acad. 1871, 73 (52), 1872. Orthotype *Syrichtus ericetorum* Boisduval.

*Heliopetes*, as pointed out at some length in the first edition of this work, is structurally very close to *Pyrgus*, but the general habitus of the included species is so different, and they present so many features in common, that we have concluded to restore the genus to its former independent rank. The species of *Heliopetes* which belong to our fauna may be distinguished from the members of the genus *Pyrgus* by the pale brownish or ochreous markings on the under surface of the secondaries, in place of the repetition of pale spots on a darker ground, or of distinct fuscous marks on a whitish ground, which characterizes the latter genus. Pl. I, fig. 2.

### Key to the Species

1. Basal third of wings dark.....2
   This area not more than slightly shaded.....3
2. Secondaries with a subterminal series of large white crescents.....*ericetorum*
   These crescents much reduced.....*domicella*

3. Cell of secondaries below clear white.....*nivella*
   Cell more or less brown on under surface.....4
4. Secondaries with broad smooth brown shades below.....5
   With a definite pattern of yellowish brown, no broad shades.....*ericetorum*
5. Inner boundary of outer shade oblique, almost straight.....*laviana*
   Inner boundary of outer shade curved like the outer margin of the wing
   *macaira*

1. **Heliopetes domicella** (Erichson). Pl. X, fig. 9.

*Syrichtus domicella* Erichson, Schomb. Reise n. Guiana III, 604, 1848. British Guiana.

*Pyrgus adepta* Herrich-Schaeffer, Corr.-Blatt Regensb. XVIII, 171, 1864. Plötz, Mitth. Nat. Ver. Vorpomm XV, 3, 1884. Bogota.

*Pyrgus nearchus* Edwards, Papilio II, 26, 1882. Arizona.

*Pyrgus willi* Plötz, Mitth. Nat. Ver. Vorpomm. XV, 3, 1884. Minas Geraes.

*Pyrgus aconita* Id., op. cit. 3, 1884. Georgia.

*Hesperia domicella* Holland, Butterfly Book 327, pl. XLVII, fig. 19, 1898.

*Heliopetes domicella* Draudt, Seitz's Macrolep. V, 914, pl. 178c, 1923.

Arizona, April and August to October. South to the Argentine.

This and the three following species have both the costal fold and tibial tuft in the male sex.

2. **Heliopetes ericetorum** (Boisduval). Pl. X, fig. 10.

*Syrichtus ericetorum* Boisduval, Ann. Soc Ent. France (2), X, 313, 1852. California.

*Syrichtus alba* Edwards, Proc. Ent. Soc. Phil. VI, 206, 1866. Arizona.

*Pyrgus ericetorum* Wright, Butt. W. Coast 250, pl. XXXI, fig. 456, 1905.

*Leucochitonea ericetorum* Oberthür, Etudes Lep. Comp. VI, 339, pl. 137, fig. 1210, 1912. (Boisduval's type).

*Heliopetes laviana* form *ericetorum* Draudt, Seitz's Macrolep. V, 915, pl. 178f, 1923.

*Urbanus ericetorum* Comstock, Butt. Cal. 209, fig. A69, A70; pl. 58, fig. 14–16, 1927.

California, April to September; Arizona, July and September; Utah, June.

Draudt's figures are poor, especially that of the under side. We are in doubt whether he has *ericetorum* or another species under this name.

3. **Heliopetes laviana** (Hewitson). Pl. X, fig. 11.

*Leucochitonea laviana* Hewitson, Desc. Hesp. 48, 1868. Nicaragua.

*Leucochitonea pastor* Felder, Verh. z. -b. Ges. Wien XIX, 476, 1869. Lerma, Mexico.

*Pyrgus leca* Butler, Trans. Ent. Soc. London 510, 1870. Venezuela.

*Heliopetes laviana* Draudt, Seitz's Macrolep. V, 915, pl. 178e, 1923.

Texas, April, June, and July to September. The species extends through Central America into Colombia.

4. **Heliopetes macaira** (Reakirt). Pl. X, fig. 12.

*Pyrgus macaira* Reakirt, Proc. Acad. Nat. Sci. Phil. 334, 1866. Near Vera Cruz, Mexico.

*Syrichtus oceanus* Edwards, Trans. Am. Ent. Soc. III, 213, 1871. Arizona.
*Leucochitonea locutia* Hewitson, Exot. Butt., Leuch. pl. 2, fig. 19, 20, 1875. Taboga Id., Panama.
*Heliopetes macaira* Draudt, Seitz's Macrolep. V, 915, pl. 178e, 1923.
Brownsville, Texas, May and June; Mexico.

**4a.** form **nivella** Mabille.
†*Leucoscirtes nivea* Scudder (not *niveus* Cramer), Rept. Peabody Acad. 1871, 73 (52), 1872. Tehuantepec, Guatemala.
*Leucoscirtes nivella* Mabille, Bull. Soc. Ent. Belg. XXVII, LV, 1883. Bogota.
*Leucochitonea orbigera* Mabille, Le Nat. X, 242, 1888. Brazil.
*Heliopetes nivella* Godman and Salvin, Biol. Cent.-Am., Rhop. II, 446, pl. 90, fig. 22–24, 1897.
Draudt, Seitz's Macrolep. V, 914, pl. 178d, 1923.
*Leucochitonea eulalia* Godman (Plotz ms.), Ann. Mag. Nat. Hist. (7), XX, 147, 1907.
We regard *nivella* as a pale form of *macaira*, rather than as a distinct species.

## Genus **Antigonus** Hübner

Logotype *Urbanus vetus erosus* Hübner

*Antigonus* Hübner, Verz. bek. Schmett. 108, 1820.
‡*Lintneria* Edwards, Trans. Am. Ent. Soc. VI, 57, 67, 1877. Haplotype *Hesperia zampa* Edwards (*pulverulenta*).
*Systasea* Butler, Can. Ent. IX, 120, 1877. New name for *Lintneria* Edwards, preoccupied by *Lintneria* Butler, Lepidoptera, published a month earlier.

Palpi porrect, moderate; second joint slightly hairy; third slightly drooping in dried specimens. Antennae about one-half as long as primaries; club moderate, curved, fusiform, rather blunt. Primaries with a costal fold in the male; costa slightly curved; outer margin curved, with a shallow excavation before anal angle; inner margin slightly concave, scarcely longer than outer; upper discocellular short, middle and lower about equal. Vein $Cu_2$ twice as far from $Cu_1$ as from base of cell. Secondaries very irregular with emarginations opposite cell and before anal angle. Pl. VIII, fig. 4.

**1. Antigonus pulverulenta** (Felder). Pl. XII, fig. 23
*Leucochitonea pulverulenta* Felder, Verh. z-b. Ges. Wien XIX, 478, 1869. Orizaba, Mexico.
*Hesperia zampa* Edwards, Trans. Am. Ent. Soc. V, 207, 1876. South Apache, Arizona.
*Tagiades taeniatus* Plötz, Jahrb, Nass. Ver. XXXVII, 41, 1884. Oaxaca.
*Systasea pulverulenta* Godman and Salvin, Biol. Cent. -Am., Rhop. II, 413, pl. 87, fig. 24, 25, 1895.
Draudt, Seitz's Macrolep. V, 904, pl. 176e, 1923.
*Systasea zampa* Holland, Butterfly Book 329, pl. XLVI, fig. 1, 1898.
*Antigonus pulverulenta* Comstock, Butt. Cal. 210, pl. 58, fig. 17, 18, 1927.
Arizona, April, July, August, and October; Texas, April and October; California, October.

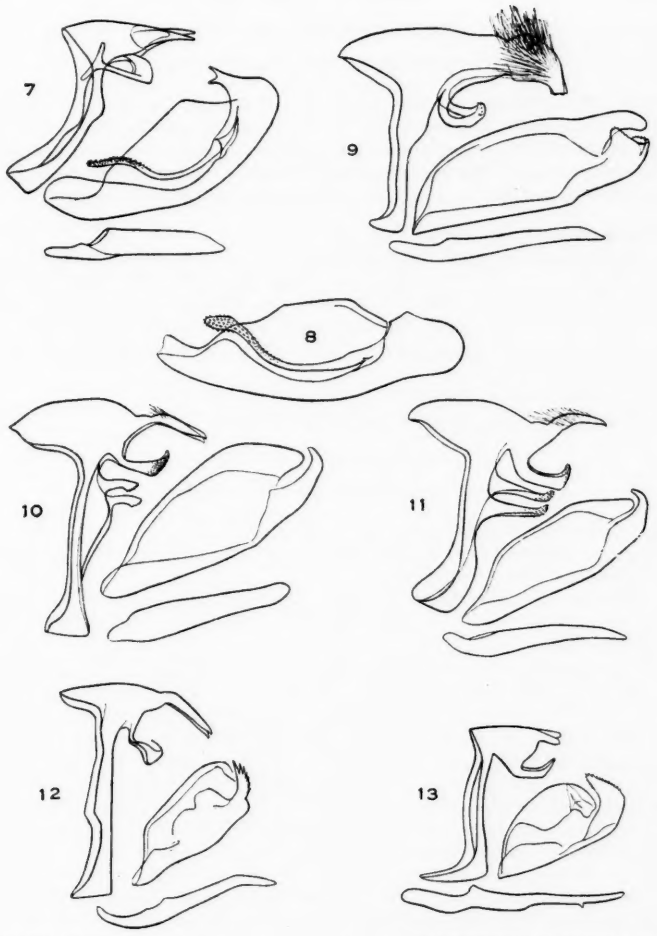




PLATE X. MALE GENITALIA

Fig. 7. *Pyrgus communis*. Fig. 8. *P. communis* form *albescens*. Fig. 9. *Heliopetes domicella*. Fig. 10. *H. ericetorum*. Fig. 11. *H. laviana*. Fig. 12. *H. macaira*. Fig. 13. *Celotes nessus*.

## Genus **Celotes** Godman and Salvin

Haplotype *Pholisora nessus* Edwards.

*Celotes* Godman and Salvin, Biol. Cent. -Am., Rhop. II, 452, 1899.

The description of *Antigonus* applies almost equally well to *Celotes*. *C. nessus* differs in the relatively larger antennal club, but is otherwise much like *pulverulenta* in structure. The superficial appearance of the two species is, however, very different, and they probably deserve to stand in different genera.

1. **Celotes nessus** (Edwards). Pl. X, fig. 13.

*Pholisora nessus* Edwards, Can. Ent. IX, 192, 1877. San Antonio, Texas.
*Spilothyrus notabilis* Strecker, Lep. Rhop. 131, 1878. San Antonio, Texas.
*Carcharodus radiatus* Plötz, Mitt. Nat. Ver. Vorpomm. XV, 4, 1884, Texas.
*Hesperia nessus* Holland, Butterfly Book 329, pl. XLVII, fig. 17, 1898.
*Celotes nessus* Godman and Salvin, Biol. Cent. -Am., Rhop. II, 452, pl. 91, fig. 27–29, 1899.
Draudt, Seitz's Macrolep. V, 919, pl. 179a, 1923.
Texas, New Mexico, and Arizona, April to August.

## Genus **Pholisora** Scudder

Orthotype *Papilio catullus* Fabricius

*Pholisora* Scudder, Rept. Peabody Acad. 1871, 72 (51), 1872.
*Staphylus* Godman and Salvin, Biol. Cent. -Am., Rhop. II, 429, 1896. Orthotype *Helias ascalaphus* Staudinger.
*Bolla* Mabille, Gen. Ins. XVII, 72, 1903. Logotype —*pullata* Mabille.
*Hesperopsis* Dyar, Jn. N. Y. Ent. Soc. XIII, 118, 1905. Orthotype *Thanaos alpheus* Edwards.

The species grouped in this genus offer a troublesome problem in generic distinctions. *Bolla* was separated from *Pholisora* by Mabille on the basis of the more pointed club of the antennae. Dyar associates *Hesperopsis* in his description with *Pyrgus* (*Hesperia*) instead of *Pholisora* and calls attention to the long palpi, especially the long third joint, and the absence of the costal fold. Bleached and mounted structures of *alpheus libya*, *catullus*, *ceos*, and *hayhurstii* show the following things to be true: In *alpheus* the third joint of the palpi is about three-fifths as long as the second and both are slender; the vestiture of the third joint, whose extent is outlined in the figure, makes it appear about twice as long as it really is. *Libya*, associated with *alpheus*, has the third joint relatively shorter, both second and third thicker, the vestiture of the third similar, and that of the second deeper. The entire appendage looks more like the palpus of *catullus* than like that of *alpheus*. Vein $R_1$ of the primaries of *alpheus* arises well before the middle of the cell, while in the other species it arises near the middle, usually slightly beyond. *Ceos* differs from *catullus* in the relatively longer third palpal joint and thicker second, and in the short vestiture of the third, indicated by the outer line in the figure. In the shape of the wings it is intermediate between *catullus* and *hayhurstii* and farthest removed from *alpheus*. The antennal club is thickest in *alpheus* and most slender in *ceos*, but if the same aspect be compared the species are seen to differ but slightly. From these facts it appears that there

is no closer bond between *alpheus* and *libya* than between *libya* and *catullus*, while *ceos* varies in the opposite direction from *catullus* but in the structure of the palpi shows some affinity with the first two species. For these reasons the group should be regarded as one genus with a wide range of structural variation. In this sense *Pholisora* may be characterized as follows:

Palpi exceeding the front by the length of the head or more; second joint oblique, rather long, with moderate scaly vestiture; third porrect, slender, long. Antennae about one-half as long as primaries; club more or less tapered and blunt. Wings rounded, secondaries with or without a slight indentation in the outer margin at the end of the cell and sometimes with a slight lobe at the anal angle. Neuration variable; vein $R_1$ of primaries never much beyond middle of cell and vein $Cu_2$ about equidistant from base of cell and $Cu_1$; upper discocellular long, over half the length of the middle discocellular. Male with or without costal fold, never with tibial tuft. Pl. VIII, fig. 5.

The foregoing account was published in essentially the same form in the first edition of this work, and we find no adequate grounds for adopting a different usage. It must remain for the present a matter of opinion whether *hayhurstii* and its allies should be included in *Staphylus* as a distinct genus or grouped as we are leaving them here.

KEY TO THE SPECIES

1. Primaries with a series of dark dashes.....*alpheus*
   Primaries without dark dashes.....2
2. Secondaries with white spots below.....3
   Secondaries without white spots below.....4
3. Under surface pale, yellowish; upper surface of primaries with transverse row of spots complete.....*lena*
   Under surface usually less pale and with numerous white spots when upper surface is heavily spotted; possibly not distinct from the preceding.....*libya*
4. Head and palpi ochreous.....*ceos*
   Head and palpi dark, concolorous with body.....5
5. Upper surface of an even shade.....6
   With faint dark transverse bands.....7
6. Under surface brownish black.....*catullus*
   Under surface grayish glaucous.....*mejicanus*
7. Primaries with hyaline subapical spots.....*hayhurstii, mazans*
   No such spots.....*brennus*

1. **Pholisora alpheus** (Edwards). Pl. XI, fig. 16.

   *Thanaos alpheus* Edwards, Trans. Am. Ent. Soc. V, 206, 1876. New Mexico.
   *Pholisora oricus* Edwards, Can. Ent. XI, 51, 1879. Nevada.
   *Pholisora alpheus* Godman and Salvin, Biol. Cent. -Am., Rhop. II, 442, pl. 90, fig. 15, 1897.
   . Holland, Butterfly Book 331, pl. XLV, fig. 2, 1898.
   Wright, Butt. W. Coast 235, pl. XXX, fig. 407, b, 1905.
   Draudt, Seitz's Macrolep. V, 913, pl. 177i, 1923.
   Comstock, Butt. Cal. 210, pl. 58, fig. 19–21, 1927.
   *Pholisora arizonensis* Mabille and Boullet, Bull. Soc. Ent. France 100, 1917. Arizona.

Texas, New Mexico, and Arizona, north into Colorado and Nevada, March to July.

2. **Pholisora libya** (Scudder). Pl. XI, fig. 17.

*Heteropterus libya* Scudder, Bull. Geol. Surv. Terr. IV, 258, 1878. Beaver Dam, Arizona.

*Pholisora libya* Holland, Butterfly Book 331, pl. XLVIII, fig. 14, 1898.
Wright, Butt. W. Coast 234, pl. XXX, fig. 406, b, c, 1905.
Draudt, Seitz's Macrolep. V, 913, pl. 177i, 1923.
Comstock, Butt. Cal. 211, pl. 58, fig. 22–24, 1927.

California, March and October; Utah, July; Arizona, April and October.

3. **Pholisora lena** (Edwards).

*Ancyloxypha lena* Edwards, Can. Ent. XIV, 5, 1882. Miles City, Montana.

*Pholisora libya* form *lena* Skinner and Williams, Trans. Am. Ent. Soc. XLVIII, 295, 1923.

There is one specimen in the Barnes collection which comes from the type locality. It is rather pale in color, a condition which may be the result of fading, and on the upper surface resembles a heavily spotted specimen of *libya*. On the under surface, however, it has only a few spots, while *libya* is heavily spotted below when it is well marked above. It is possible that *libya* and *lena* are the same species, but the strange contrast of a heavily spotted upper surface and a lightly spotted under surface leads us to hesitate to sink *lena* as a synonym without more conclusive data than we possess.

4. **Pholisora catullus** (Fabricius). Pl. XI, fig. 14.

*Hesperia catullus* Fabricius, Ent. Syst. III (I), 348, 1793. "In Indiis."

*Pholisora catullus* Scudder, Butt. E.U.S. II, p. 1519, 1889.
Holland, Butterfly Book 330, pl. XLV, fig. 4, 1898.
Wright, Butt. W. Coast 234, pl. XXX, fig. 403, 1905.
Draudt, Seitz's Macrolep. 912, pl. 177h, 1923.
Comstock, Butt. Cal. 211, pl. 58, fig. 25–27, 1927.

United States and Southern Canada, April to October.

Draudt's figures do not show the true differences between this species and *mejicanus*.

5. **Pholisora mejicanus** (Reakirt). Pl. XI, fig. 15.

*Nisoniades mejicanus* Reakirt, Proc. Acad. Nat. Sci. Phil. 334, 1866. Vera Cruz, Mexico.

*Pholisora mexicanus* Godman and Salvin, Biol. Cent.-Am., Rhop. II, 441, pl. 90, fig. 11, 12, 1897.

*Pholisora mejicanus* Draudt, Seitz's Macrolep. V, 913, pl. 177h, 1923.

New Mexico and Arizona.

The upper surface of the wings resembles *catullus* but the glaucous gray appearance of the under surface is unmistakable.

6. **Pholisora ceos** Edwards. Pl. XI, fig. 18.

*Pholisora ceos* Edwards, Papilio II, 140, 1882. Graham Mts., Arizona.

*Staphylus ceos* Godman and Salvin, Biol. Cent.-Am., Rhop. II, 432, pl. 89, fig. 7, 8, 1896.

New Mexico, June; Arizona, April, June, July.

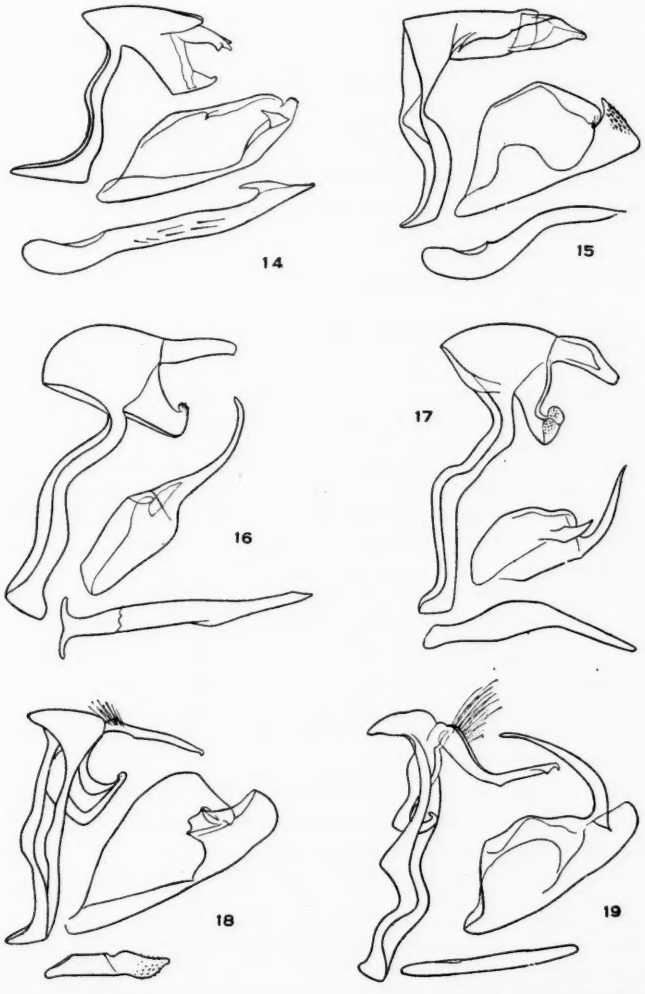




PLATE XI. MALE GENITALIA OF *Pholisora*

Fig. 14. *catullus*. Fig. 15. *mejicanus*. Fig. 16. *alpheus*. Fig. 17. *libya*. Fig. 18. *ceos*. Fig. 19. *hayhurstii*.

7. **Pholisora hayhurstii** (Edwards). Pl. XI, fig. 19.

*Hesperia hayhurstii* Edwards, Trans. Am. Ent. Soc. III, 22, 1870. Missouri,
*Pholisora hayhurstii* Scudder, Butt. E.U.S. III, p. 1857, 1889.
*Staphylus hayhursti* Godman and Salvin, Biol. Cent.-Am., Rhop. II, 433, pl. 89, fig. 16, (male gen.), 1896.
*Pholisora hayhursti* Holland, Butterfly Book 331, pl. XLVIII, fig. 16, 1898.

Florida, north and west to Minnesota and Texas, March to October. Some specimens have merely a trace of the subapical spots.

8. **Pholisora mazans** (Reakirt). Pl. XII, fig. 20.

*Carcharodus mazans* Reakirt, Proc. Acad. Nat. Sci. Phil. 1866, 335. Near Vera Cruz, Mexico.
*Helias ascalaphus* Staudinger, Verh. z. -b. Ges. Wien XXV, 116, 1876. Panama.
*Tagiades vincula* Plötz, Stett. ent. Zeit. XLVII, 113, 1886. Panama.
*Staphylus ascalaphus* Godman and Salvin, Biol. Cent.-Am., Rhop. II, 432, pl. 89, fig. 12-15, 1896.
Draudt, Seitz's Macrolep. V, 904, pl. 176 f, 1922.
*Pholisora mazans* Lindsey, Denison U. Bull., Jn. Sci. Lab. XXI, 86, pl. XXVII, fig. 7a, c, e, 1925.

*Mazans* was first recorded from the United States by Skinner and Williams, and their record of a series from Corpus Christi, Texas, is the basis for the inclusion of the species here. The species flies in April. It is abundant in Central America, but has usually been recorded as *ascalaphus*.

9. **Pholisora brennus** (Godman and Salvin). Pl. XII, fig. 21.

*Staphylus brennus* Godman and Salvin, Biol. Cent.-Am., Rhop. II, 434, pl. 89, fig. 23 (male gen.), 1896. Volcan de Chiriqui, Panama.
Skinner, Ent. News XII, 171, 1901.
Draudt, Seitz's Macrolep. V, 905, pl. 176f, 1923.

We cannot add to the conclusion expressed in Skinner and Williams' paper, which indicates that the species reported from the border may have been *brennus* or *imbras* (Pl. XII, fig. 22). No specimens of either species from the United States are in our possession.

## Genus **Achlyodes** Hübner

Logotype *Papilio busirus* Cramer

*Achlyodes* Hübner, Verz. bek. Schmett. 107, 1820.
*Eantis* Boisduval, Spec. Gen. pl. 13, fig. 6, 1836. Haplotype *Urbanus vetus thraso* Hübner.
*Sebaldia* Mabille, Gen. Ins. XVII, 66, 1903. Haplotype *Papilio busirus* Cramer.

Palpi porrect; second joint rather large, densely and smoothly scaled; third small, distinct. Antennae about one-half as long as primaries; club extremely slender and long, the tip curved. Costa of primaries rounded in basal half and almost straight to apex; outer margin excavated below apex, thence well rounded to anal angle; cell about three-fifths as long as wing; vein $M_2$ intermediate between $M_1$ and $M_3$. Secondaries roughly quadrate; costa and inner margin curved, outer bent to an obtuse angle between $Cu_1$ and $M_3$ and produced between $M_1$ and R. Pl. VIII, fig. 6.

1. **Achlyodes thraso** (Hübner) Pl. XII, fig 25.

*Urbanus vetus thraso* Hübner, Samml. exot. Schmett. I, pl. 151, figs. 1–4, 1807–16.

*Hesperia tamenund* Edwards, Trans. Am. Ent. Soc. III, 215, 1871. Near Waco, Texas.

*Eantis thraso* Godman and Salvin, Biol. Cent.-Am., Rhop II, 405, pl. 87, fig. 7, (male gen.), 1895.

Draudt, Seitz's Macrolep. V, 902, pl. 176b, 1923.

Texas, May, July, November, and December. South to Brazil.

## Genus **Xenophanes** Godman and Salvin

Orthotype *Papilio tryxus* Cramer

*Xenophanes* Godman and Salvin, Biol. Cent.-Am., Rhop. II, 387, 1895.

Palpi oblique, third joint moderate, conical, not concealed. Club of antennae very slender, curved. Costa of primaries slightly curved; apex rectangular; inner margin nearly straight, outer slightly convex between apex and vein $Cu_2$, thence nearly straight to anal angle. Costal fold absent. Cell less than two-thirds as long as wing. Vein $M_2$ intermediate, $Cu_2$ slightly nearer to base of wing than to $Cu_1$. Secondaries broadly rounded; inner margin nearly straight, anal angle subrectangular, outer margin slightly concave between veins $M_1$ and $M_3$ and very slightly between 1st A and $Cu_2$. Vein $M_2$ present, very weak; $Cu_2$ about as near to base of wing as to $Cu_1$. Pl. VIII, fig. 8.

1. **Xenophanes tryxus** (Cramer). Pl. XII, fig. 24.

*?Hesperia salvianus* Fabricius, Ent. Syst. III, 348, 1793. "In Indiis."

*Papilio tryxus* Cramer, Pap. Exot. IV, 87, pl. 334, G, H, 1871. Surinam.

*Xenophanes tryxus* Godman and Salvin, Biol. Cent.-Am., Rhop. II, 387, pl. 85, fig. 18 (male gen.), 1895.

Draudt, Seitz's Macrolep. 898, pl. 175c, 1922.

*Leucochitonea euphemie* Ehrmann, Can. Ent. XXXIX, 318, 1907. Suapure, Venezuela.

Brownsville, Texas. July; south to Brazil.

This species is easy to recognize in our fauna by the many hyaline spots in the discal area of both pairs of wings.

## Genus **Ephyriades** Hübner

Logotype *Papilio otreus* Cramer

*Ephyriades* Hübner, Verz. bek. Schmett. 111, 1820.

*Melanthes* Mabille, Gen. Ins. XVII, 80, 1904. Logotype *Nisoniades brunnea* Herrich-Schaeffer.

In general structure this genus is close to *Erynnis* but the secondaries are relatively a little larger, the outer margin of the primaries longer and more oblique, the apex more produced and rectangular, and the anal angle more broadly rounded. The antennae are moderate and the club fusiform, sharply pointed, and evenly curved. Pl. VIII, fig. 2.

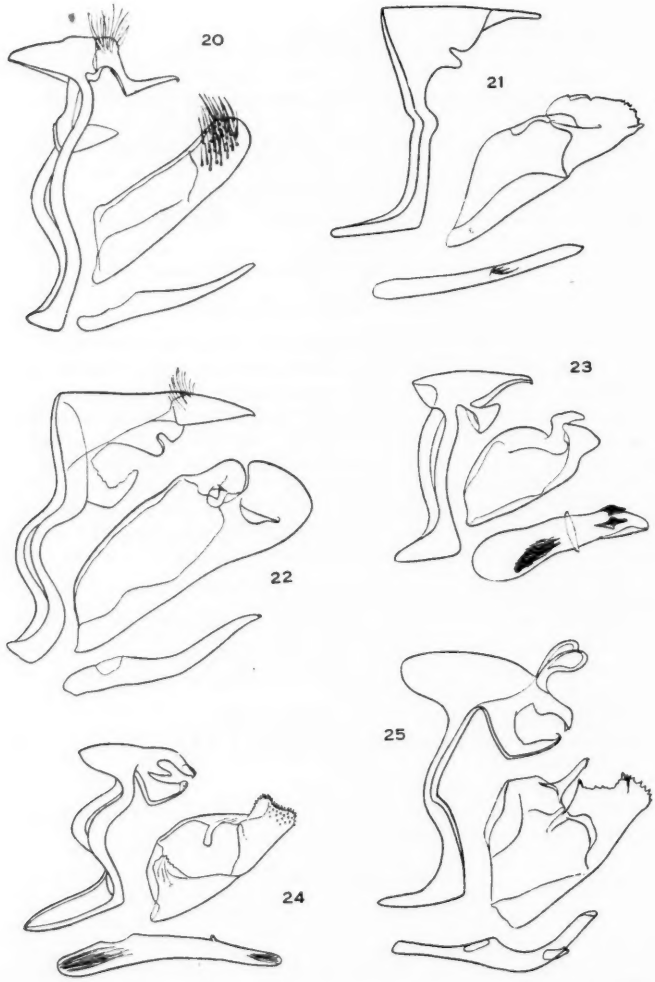




PLATE XII. MALE GENITALIA

Fig. 20. *Pholisora mazans.* Fig. 21. *P. brennus.* Fig. 22. *P. imbras.* Fig. 23. *Antigonus pulverulenta.* Fig. 24. *Xenophanes tryxus.* Fig. 25. *Achlyodes thraso.*

1. **Ephyriades zephodes** (Hübner). Pl. XIII, fig. 26.

*Oileides zephodes* Hübner, Samml. exot. Schmett. II, pl. 364, fig. 1–4, 1806–16.

*Nisoniades brunnea* Herrich-Schaeffer, Corr.-Blatt Regensb. XVIII, 172, 1864. Cuba.

Skinner, Ent. News XIV, 110, 1903.

*Eudamus electra* Lintner, Can. Ent. XIII, 63, 1881. Hamilton, Ontario.

*Melanthes zephodes* Draudt, Seitz's Macrolep. V, 918, pl. 178i, 1923.

The species has been taken at several places in southern Florida, including Sugar Loaf Key (Skinner), Royal Palm State Park, March (Englehardt), and Homestead, Key Largo, February (Haskin).

Skinner and Williams discuss the synonymy in detail in their paper on genitalia.

Genus **Chiomara** Godman and Salvin

Orthotype *Achlyodes mithrax* Möschler

*Chiomara* Godman and Salvin, Biol. Cent.-Am., Rhop. II, 453, 1899.

Similar to *Erynnis;* outer margin of primaries only two-thirds as long as inner, strongly curved; vein $R_1$ arising just beyond middle of cell and reaching costa before end of cell. Male with tibial tuft but no costal fold. Pl. I, fig. 9.

1. **Chiomara asychis** (Cramer). Pl. XIII, fig. 27.

*Papilio asychis* Cramer, Pap. Exot. IV, 87, pl. 334, E, F, 1781.

*Pyrgus georgina* Reakirt, Proc. Acad. Nat. Sci. Phil. 88, 1868. Near Vera Cruz, Mexico.

*Pythonides dilucida* Möschler, Verh. z.-b. Ges. Wien 338, 1876. Surinam.

*Chiomara asychis* Godman and Salvin, Biol. Cent.-Am., Rhop. II, 453, pl. 91, fig. 1–3, 1899; p. 741, 1901.

Draudt, Seitz's Macrolep. V, 913, pl. 178a, 1923.

Texas and Arizona, April, May, and October; the species is not uncommon in Central and South America.

Genus **Erynnis** Schrank

Logotype *Papilio tages* Linnaeus

*Erynnis* Schrank, Fauna Boica II, I, 157, 1801.

Barnes and Lindsey, Ann. Ent. Soc. Am. XV, 94, 1922.

Lindsey, Ann. Ent. Soc. Am. XVIII, 86, 1925.

*Thymele* Fabricius, Ill. Mag. VI, 287, 1807. Logotype *Papilio tages* Linn.

Lindsey, Ann. Ent. Soc. Am. XVIII, 104, 1925.

*Thanaos* Boisduval, Icones 240, 1832–3. Logotype *Hesperia juvenalis* Fabricius.

Palpi large, exceeding front by about length of head; vestiture shaggy; third joint stout and roughly scaled. Antennae moderate; club fusiform, curved. Costa of primaries slightly convex, flattened along fold; outer margin in most species evenly rounded, in some more strongly curved opposite cell; relative width of primaries variable. Cell scarcely two-thirds as long as wing; vein $M_2$ intermediate, $R_1$ to $R_5$ in distal third of cell, $R_1$ ending beyond end of cell. Upper discocellular less than one-half as long as middle. Secondaries variable in size and shape, broad; outer margin rounded to wavy. Costal fold present except in *gesta*. Hind tibiae of male with tufts in a few species. Pl. XVII, fig. 3.

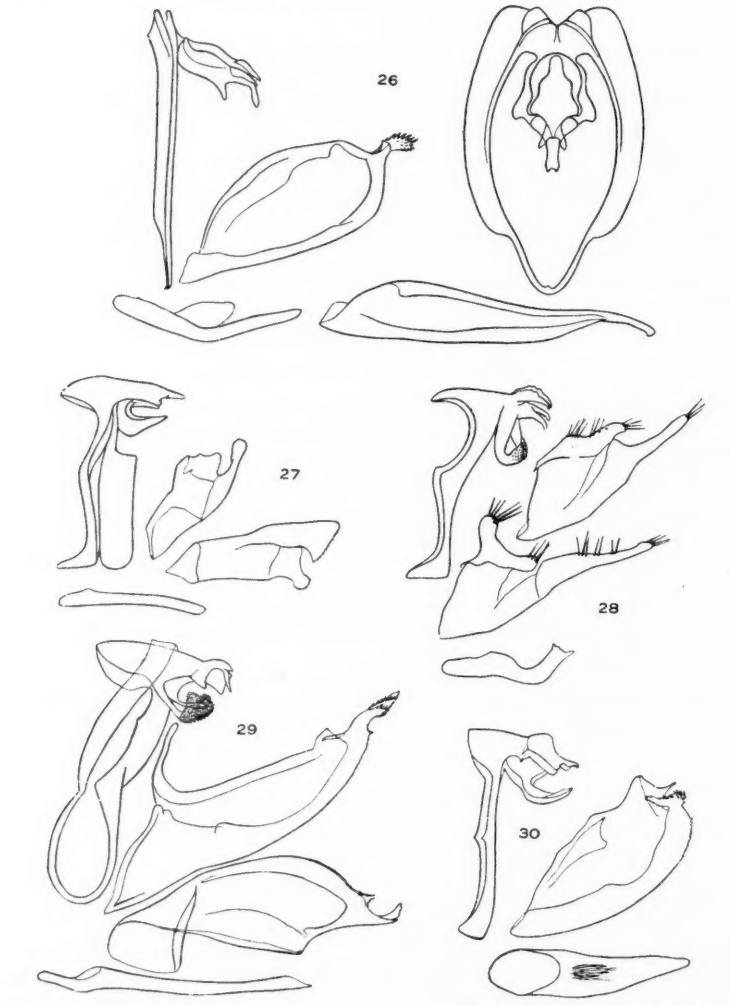




PLATE XIII. MALE GENITALIA

Fig. 26. *Ephyriades zephodes.* Fig. 27. *Chiomara asychis.* Fig. 28. *Erynnis gesta.* Fig. 29. *Timochares ruptifasciata.* Fig. 30. *Grais stigmaticus.*

A key to the species of *Erynnis* based on superficial characters is of comparatively little use, for some of the species are too closely related to be separated accurately without an examination of the genitalia. The following key is based on fairly typical specimens, but still it is not reliable for the separation of all species. The male genitalia can often be examined sufficiently well *in situ* by brushing away the scales from the tip of the abdomen and using a strong hand lens or a binocular microscope.

Since it is possible to include figures of the genitalia here it has not been thought necessary to make a point of citing references to figures which have appeared elsewhere. Draudt's figures of the entire insects, which we have cited in so many cases, can scarcely be of use to the beginner in this genus and are also being omitted. A few are recognizable but many are not.

### Key to the Species

1. Fringes of hind wings white....13
   Fringes never white....2
2. Primaries without distinct hyaline spots, sometimes with one or two clouded spots next to costa....3
   Primaries with at least a subapical row of hyaline spots (or with extremely dark wings, *zarucco* male)....5
3. Expanse under thirty mm.; male with tibial tuft; apex of primaries rather sharply angled....*icelus*
   Expanse usually over thirty mm.; no tuft in male; apex of primaries more obtuse and outer margin more rounded....4
4. Gray powdering heavier toward apex of primaries; distribution general...*brizo*
   Primaries usually evenly powdered with gray scales; inner part of median band usually obsolete or broken; southwestern and Californian species *burgessi; lacustra*
   Powdering scant or absent; dark marks of primaries united to form broad bands; under surface without distinct spots; male with tuft but no fold; southwestern....*gesta*
5. Under surface of secondaries with two pale subapical spots, or at least a trace of them....6
   No such spots....7
6. Gray vestiture mostly of fine hairs....*propertius*
   Gray vestiture scaly....*juvenalis*
7. Hyaline spots large, at least a trace of one in end of cell; dark markings of primaries contrasting (female), or spots lacking and primaries with little or no gray vestiture (male)....*horatius, meridianus*
   Spots small, color very dark or gray powdering conspicuous....8
8. Very dark, sometimes with a brownish patch at end of cell; maculation obscure; male with tibial tuft....*zarucco*
   Tuft absent, marks more or less contrasting....9
9. Dark marks conspicuous, secondaries checkered; fresh specimens with a purplish luster....*martialis*
   Not such insects....10
10. Larger, marks more or less obscured toward base of primaries *persius, pernigra, avinoffi*

Usually smaller, marks more evenly distinct over entire wing.....11
11. Fringes usually evenly colored.....12
Fringes pale tipped; western.....*afranius*
12. Secondaries with pale spots below clear-cut.....*lucilius*
Spots absent or diffuse; western species.....*callidus*
13. Tufts of dark scales in base of white fringe all along outer margin *scudderi, pacuvius*
Rarely with a suggestion of such tufts.....14
14. Primaries narrower than in other species; male with a tibial tuft.....*funeralis*
Primaries normal; no tuft.....*tristis, clitus*

1. **Erynnis icelus** (Scudder and Burgess). Pl. XIV, fig. 1.
*Nisoniades icelus* Scudder and Burgess, Proc. Bost. Soc. Nat. Hist. XIII, 288, fig. 3, 1870. New England.
*Nisoniades bautista* Plötz, Jahrb. Nass. Ver. XXXVII, 36, 1884. California.
*Thanaos icelus* Scudder, Butt. E. U. S. II, p. 1507, 1889.
Holland, Butterfly Book 333, pl. XLVIII, fig. 17, 1898.
*Nisoniades hamamaelidis* Scudder (Fitch ms.), Butt. E. U. S. II, p. 1507, 1889.
Northern United States and Canada, extending south to North Carolina (Brimley and Sherman, April) in the east, and to New Mexico in the west (Jemez Mts., April and May, Woodgate). Apparently the species does not enter the plains region in the central United States. It flies from April to July in various regions.

2. **Erynnis brizo** (Boisduval and LeConte). Pl. XIV, fig. 2.
† *Papilio juvenalis* Abbot and Smith (not Fabricius), Lep. Ins. Ga. pl. XXI, upper figure, 1797.
*Thanaos brizo* Boisduval and LeConte, Lep. Am. Sept., pl. 66, 1833.
Scudder, Butt. E. U. S. II, p. 1500, 1889.
Holland, Butterfly Book 332, pl. XLV, fig. 7, 1898.
Atlantic Coast to Rocky Mountains, Gulf to Southern Canada; April to July.
Eastern specimens are easy to identify but it is rather difficult to separate *burgessi*, *lacustra*, and *brizo* when they come from the same region.

2a. race **somnus** Lintner.
*Nisoniades somnus* Lintner, Papilio I, 73, 1881. Florida.
Florida, February and April. This is merely a very dark form of *brizo*.

3. **Erynnis burgessi** (Skinner).
*Thanaos burgessi* Skinner, Trans. Am. Ent. Soc. XL, 203, 1914. New Mexico and Arizona.
The species has been taken in Arizona from April to July and in New Mexico in May, and ranges northward into Colorado and Utah.

4. **Erynnis lacustra** (Wright). Pl. XIV, fig. 4.
*Nisoniades lacustra* Wright, Butt. W. Coast 253, pl. XXXII, 480, 1905. Blue Lakes, California.
† *Thanaos callidus* Skinner and Williams (not Grinnell), Trans. Am. Ent. Soc. L, 195, 1924.

*Thanaos lacustra* Draudt, Seitz's Macrolep. V, 917, pl. 178i, 1923.
*Erynnis lacustra* Comstock, Butt. Cal. 212, pl. 59, fig. 1, 1927. (Female type).
California, April, May, and June.

This is not a form of *brizo*, as some writers have stated, but is more nearly related to *burgessi*. The genitalia are distinctly different, although the difference is not great. The confusion of *lacustra* and *callidus* is merely a matter of nomenclature, due to Grinnell's use of a mixed type series for the latter species. We base our usage of *callidus* on the figure of male genitalia published with the original description.

5. **Erynnis gesta** (Herrich-Schaeffer). Pl. XIII, fig. 28.
*Thanaos gesta* Herrich-Schaeffer, Corr.-Blatt Regensb. XVII, 142, 1863. Cuba.
*Thanaos invisus* Butler and Druce, Cist. Ent. I, 114, 1872. Costa Rica.
*Achlyodes blanda* Plötz, Jahrb. Nass. Ver. XXXVII, 19, 1884.
*Chiomara gesta* Godman and Salvin, Biol. Cent.-Am., Rhop. II, 455, pl. 91, fig. 7–9, 1899.
Draudt, Seitz's Macrolep. V, 913, pl. 178a, 1923.
*Nisoniades llano* Dodge, Can. Ent. XXXV, 78, 1903. Llano Co., Texas.
Texas and Arizona, July. The species is common in Peru and Brazil, and apparently only strays into our country.

6. **Erynnis persius** (Scudder). Pl. XIV, fig. 5.
† *Thanaos cervantes* Boisduval (not Grasl.), Ann. Soc. Ent. France X, 310, 1852.
*Nisoniades persius* Scudder, Proc. Essex Inst. III, 170, 1863. New England.
*Thanaos persius* Scudder, Butt. E. U. S. II, p. 1468, 1889.
Holland, Butterfly Book 334, pl. XLVIII, fig. 1, 1898.
*Nisoniades perseus* Wright, Butt. W. Coast 252, pl. XXXII, fig. 461, 1905.
*Erynnis persius* Lindsey, Denison U. Bull., Jn. Sci. Lab. XXII, 109, 1927.

The typical form has an expanse of about thirty-five millimeters and is dark and obscurely marked, especially on the basal half of the wings. It has been recorded throughout the United States and North into Alaska, May to August. Since *persius*, *lucilius*, and *afranius* may now be definitely separated by larval characters, it is difficult to determine the true distribution of any of these related species or to pronounce upon the validity of *avinoffi*. The larva of true *persius* eats poplar.

6a. race **pernigra** Grinnell.
*Thanaos pernigra* Grinnell, Ent. News XVI, 34, 1905. California.
*Erynnis persius pernigra* Comstock, Butt. Cal. 213, pl. 59, fig. 56, 1927.
A very dark Pacific Coast race occurring in California in July. In the absence of more definite information we retain this usage, although a study of the early stages may show *pernigra* to be a good species or a form of one of the related species.

7. **Erynnis avinoffi** (Holland).
*Thanaos avinoffi* (Holland), Ann. Carnegie Mus. XIX (3), 156, 1930.

Described from "over forty specimens from various points in the Yukon Valley, valley of the Kuskokwim, and various other points in Alaska." We have Alaskan specimens which we take to be conspecific with the types; they were caught in June. Dr. Holland states in his account of the species that "It is the species of the genus which is most prevalent in Alaska, and which I designated as *T. persius* in the Entomological News, Vol. XI, 1900, p. 420." It is obviously very close to true *persius*, and in view of the uncertain status of this species complex and the significance of the early stages within it, we cannot make a final disposition of the name with the limited information available.

8. **Erynnis lucilius** (Scudder and Burgess.)
*Nisoniades lucilius* Scudder and Burgess, Proc. Bost. Soc. Nat. Hist. 287, fig. 2 (male gen.), 1870. New England.
*Thanaos lucilius* Scudder, Butt. E. U. S. II, p. 1458, 1889.
Holland, Butterfly Book 333, pl. XLVIII, fig. 10, 1898.
*Erynnis lucilius* Lindsey, Denison U. Bull., Jn. Sci. Lab. XXII, 109, 1927.

Scudder figured and described the early stages of *lucilius* in his Butterflies of the Eastern United States, recording marked differences between the larvae of this species and *persius*. The larva feeds on columbine, and the adult is on the wing in the northeastern United States and southeastern Canada from April to August.

9. **Erynnis afranius** (Lintner).
*Nisoniades afranius* Lintner, 30th Rept. N. Y. Mus. Nat. Hist. 175, 1878. Colorado.
*Erynnis persius afranius* Comstock, Butt. Cal. 212, pl. 59, 2–4, 1927.
*Erynnis afranius* Lindsey, Denison U. Bull., Jn. Sci. Lab. XXII, 109, 1927.

*Afranius* has been recorded from Colorado to California and south into Arizona, from April to August. It is a smaller and grayer species than *lucilius* or *persius* and is not difficult to recognize by its superficial characters. Lindsey found adults ovipositing on lupine at 8000 feet in Colorado and reared larvae which were distinct from those of *persius* and *lucilius*.

The genitalia of *persius*, *lucilius*, and *afranius* are similar.

10. **Erynnis callidus** (Grinnell).
*Thanaos callidus* Grinnell, Ent. News XV, 114, 1904. Mt. Wilson, California.
McDunnough, Ent. News XXVIII, 232, 1917.
*Thanaos lilius* Dyar, Proc. U. S. N. M. XXVII, 788, 1904. Kaslo, B. C.
*Erynnis callidus* Comstock, Butt. Cal. 213, pl. 59, fig. 7, 8, 1927.

*Callidus* flies in California from May to July, and apparently extends through Oregon and Washington into British Columbia. The genitalia resemble those of *pacuvius*.

11. **Erynnis martialis** (Scudder). Pl. XIV, fig. 6.
*Nisoniades martialis* Scudder, Trans. Chi. Acad. Sci. I, 335, 1869. New England.

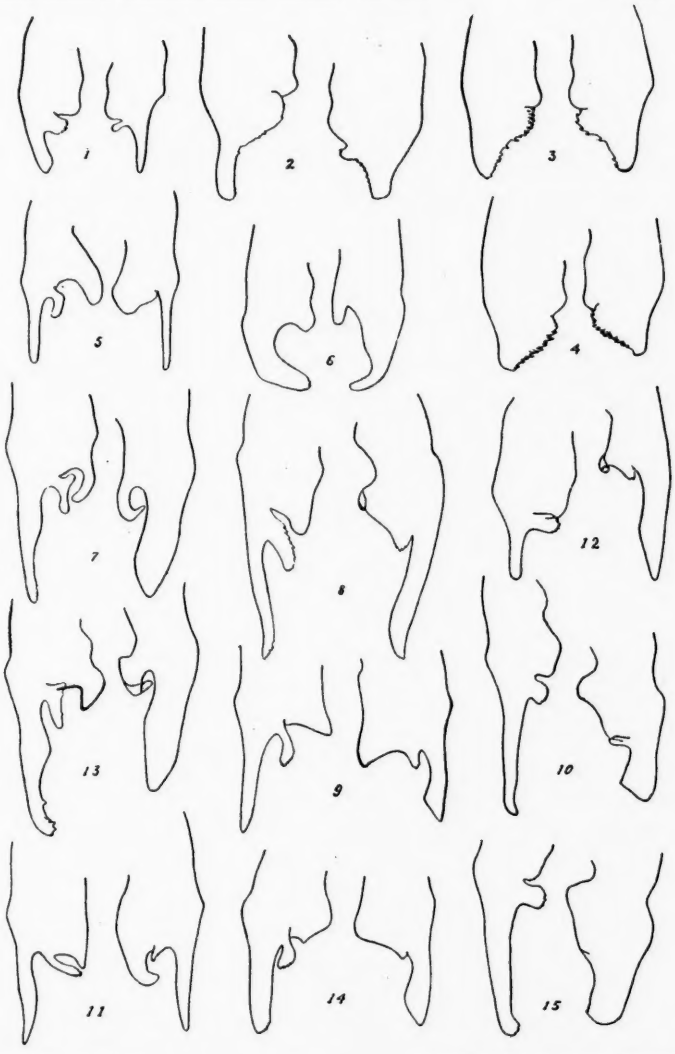




PLATE XIV. MALE GENITALIA OF *Erynnis*

Fig. 1. *icelus*. Fig. 2. *brizo*. Fig. 3. *burgessi*. Fig. 4. *lacustra*. Fig. 5. *persius*. Fig. 6. *martialis*. Fig. 7. *juvenalis*. Fig. 8. *propertius*. Fig. 9. *horatius*. Fig. 10. *zarucco*, Fig. 11. *pacuvius*. Fig. 12. *scudderi*. Fig. 13. *clitus*. Fig. 14. *tristis*. Fig. 15. *funeralis*.

*Thanaos quercus* Butler (Boisd. ms.), Ent. Mo. Mag. VI, 97, 1870.
*Thanaos martialis* Scudder, Butt. E. U. S. II, p. 1493, 1889.
Holland, Butterfly Book 335, pl. XLVIII, fig. 4, 1898.
† *Thanaos lucilius* Holland (not Lintner), Butterfly Book, pl. XLVIII, fig. 10, 1898.

New York to Alabama, west to Texas and Colorado and north into Canada; March to August.

11a. ab. **ausonius** Lintner.
*Nisoniades ausonius* Lintner, 23rd Rept. N. Y. State Cab. Nat. Hist. 166, pl. 7, fig. 11, 12, 1872. Center, New York.
Scudder, Butt. E. U. S. p. 1498, 1889.

*Ausonius* lacks the subapical hyaline spots and has the transverse series of dark dashes unusually prominent. The only record known to us is that of the unique type, which was taken on May 12, 1871.

12. **Erynnis juvenalis** (Fabricius). Pl. XIV, fig. 7.
*Hesperia juvenalis* Fabricius, Ent. Syst. III, 339, 1793.
*Nisoniades juvenis* Hübner, Verz. bek. Schmett. 108, 1820.
*Nisoniades costalis* Westwood and Hewitson, Gen. Diurn, Lep. II, 519, pl. 79, fig. 3, 1852.
*Nisoniades ennius* Scudder and Burgess, Proc. Bost. Soc. Nat. Hist. XIII, 296, fig. 9, 1870. New England.
*Nisoniades plautus* Id., op. cit. 304, fig. 16. Florida.
*Thanaos juvenalis* Scudder, Butt. E. U. S. II, p. 1476, 1889.
Holland, Butterfly Book 335, pl. XLVIII, fig. 11, 1898.
*Nisoniades juvenalis* Wright, Butt. W. Coast 252, pl. XXXII, fig. 462, 1905.
† *Nisoniades tristis* Id. (not Boisduval), op. cit. pl. XXXII, fig. 469. (Male, not female).
*Erynnis tristis* Comstock, Butt. Cal. 214, pl. 59, fig. 16–18, 1927.

Atlantic Coast to Texas and the Rocky Mountains, Gulf to northern Canada; April to August. In the south it flies also in February and March.

13. **Erynnis propertius** (Scudder and Burgess). Pl. XIV, fig. 8.
*Nisoniades propertius* Scudder and Burgess, Proc. Bost. Soc. Nat. Hist. XIII, 298, fig. 11, 1870. California.
*Nisoniades tibullus* Id., op. cit. p. 299, fig. 12. California.
*Nisoniades propertius* Wright, Butt. West Coast 252, pl. XXXII, fig. 463, 1905.
† *Nisoniades juvenalis* Id. (not Fabricius), op. cit. pl. XXXII, fig. 462 ♀.
† *Nisoniades tristis* Id. (not Boisduval), op. cit. pl. XXXII, fig. 469 ♂.
*Erynnis propertius* Comstock, Butt. Cal. 214, pl. 59, fig. 12–14, 1927.

Texas to California and northward into Canada; March to August. The abundance of hairy gray vestiture in specimens which have not been badly rubbed is very characteristic.

13a. race **borealis** Cary.
*Thanaos propertius* var. *borealis* Cary, Proc. U. S. N. M. XXXI, 455, 1906. North Nahanni River, Mackenzie.

The single type, a male, was taken on June 4, 1904. It is a dark race with the pale maculation reduced.

14. **Erynnis meridianus** Bell. Pl. XXV, fig. 6.

*Erynnis meridianus* Bell, Jn. N. Y. Ent. Soc. XXXV, 261, 1927. Arizona, Texas.

As noted in the original description this species resembles *horatius* rather closely, and for dependable identification it is necessary to examine the genitalia.

The large type series came from various localities in the two states and was taken in June and July.

15. **Erynnis horatius** (Scudder and Burgess). Pl. XIV, fig. 9.

*Nisoniades horatius* Scudder and Burgess, Proc. Bost. Soc. Nat. Hist. XIII, 301, fig. 13, 1870. New England, Texas.

*Nisoniades virgilius* Id., op. cit. p. 302, fig. 14. New England.

*Nisoniades petronius* Lintner, Papilio I, 70, 1881. Florida.

*Thanaos horatius* Scudder, Butt. E. U. S. II, p. 1486, 1889.
Holland, Butterfly Book 336, pl. XLVIII, fig. 15, 1898.

*Thanaos petronius* Holland, Butterfly Book 335, pl. XLVIII, fig. 7, 1898.
Draudt, Seitz's Macrolep. V, 916, pl. 178g, 1923.

Florida to New Mexico, north to Massachusetts, Minnesota, and Colorado; January to September in the south, June to August elsewhere.

16. **Erynnis zarucco** (Lucas). Pl. XIV, fig. 10.

*Thanaos zarucco* Lucas, Sagra's Hist. Cuba 641, 1857. Cuba.
Skinner and Williams, Trans. Am. Ent. Soc. L, 204, 1924.

*Nisoniades terentius* Scudder and Burgess, Proc. Bost. Soc. Nat. Hist. XIII, 292, fig. 6, 1870. Florida.

*Nisoniades ovidius* Id., op. cit. 295, fig. 8, 1870. Florida.

*Nisoniades naevius* Lintner, Papilio I, 69, 1881. Florida.

*Nisoniades jarucco* Gundlach, Cont. Ent. Cuba 143, 1881.

*Thanaos terentius* Scudder, Butt. E. U. S. II, p. 1490, 1889.

*Thanaos naevius* Holland, Butterfly Book 336, pl. XLVIII, fig. 3, 1898.

Florida, February to July; Alabama, August and September, north to Pennsylvania, July, and west to Mississippi, where it has been taken in July and August.

17. **Erynnis pacuvius** (Lintner). Pl. XIV, fig. 11.

*Nisoniades pacuvius* Lintner, 30th Rept. N. Y. Mus. Nat. Hist. 172, 1878.

*Thanaos pacuvius* Holland, Butterfly Book 336, pl. XLVIII, fig. 9, 1898.

California, Arizona, New Mexico, and Colorado; March, May to August.

18. **Erynnis scudderi** (Skinner). Pl. XIV, fig. 12.

† *Thanaos pacuvius* Godman and Salvin (not Lintner), Biol. Cent.-Am., Rhop. II, 458, pl. 91, fig. 16, 17, 1899.

*Thanaos scudderi* Skinner, Trans. Am. Ent. Soc. XL, 215, 1914. Fort Grant, Arizona.

Texas and Arizona, July and August. This species is very much like *pacuvius* in superficial appearance but is distinctly different in genitalic structure.

19. **Erynnis clitus** (Edwards). Pl. XIV, fig. 13.

*Thanaos clitus* Edwards, Papilio II, 180, 1882. Mt. Graham, Arizona.

Holland, Butterfly Book 336, pl. XLV, fig. 8, 1898.

*Thanaos maestus* Godman and Salvin, Biol. Cent.-Am., Rhop. II, 457, pl. 91, fig. 18, 1899. Arizona; Pinal and Puebla, Mexico.

Arizona, May to August; California and Colorado, July.

20. **Erynnis tristis** (Boisduval). Pl. XIV, fig. 14.

*Thanaos tristis* Boisduval, Ann. Soc. Ent. France (2), X, 311, 1852. California.

Oberthür, Etudes Lep. Comp. IX (I), 43, pl. 240, fig. 2081, 1913. (Type.)

*Thanaos tatius* Edwards, Papilio II, 179, 1882.

California, June, August, and October; Arizona, April to September.

21. **Erynnis funeralis** (Scudder and Burgess). Pl. XIV, fig. 15.

*Nisoniades funeralis* Scudder and Burgess, Proc. Bost. Soc. Nat. Hist. XIII, 293, fig. 7, 1870. Texas.

Wright, Butt. W. Coast 253, pl. XXXII, fig. 468, 1905.

*Nisoniades australis* Mabille, Bull. Soc. Ent. Belg. 54, 1883. Eastern Colombia.

*Thanaos funeralis* Holland, Butterfly Book 336, pl. XLVIII, fig. 12, 1898.

† *Nisoniades clitus* Wright, (not Edwards), Butt. W. Coast 252, pl. XXXII, fig. 464, 1905.

*Erynnis funeralis* Comstock, Butt. Cal. 214, pl. 59, fig. 16-18, 1927.

California, March to July; Texas to Arizona and north to Colorado, April to September.

## Genus **Timochares** Godman and Salvin

Logotype *Leucochitonea trifasciata* Hewitson

*Timochares* Godman and Salvin, Biol. Cent.-Am., Rhop. II, 417, 1896.

Palpi moderately large, much as in *Erynnis*, with a hairy second joint and a stout, conical third joint. Antennae less than one-half as long as primaries; club moderate, fusiform, curved. Costa of primaries convex, with a long fold in the male; apex rectangular, subtruncate; outer margin rounded from vein $M_1$ to anal angle. Secondaries trigonate; inner margin about as long as wing measured through cell; outer margin wavy. Neuration practically as in *E. juvenalis*. *E. funeralis* is structurally very close to this genus, but the apex of the primaries is never distinctly subtruncate and the anal angle is much more broadly rounded.

1. **Timochares ruptifasciata** (Plötz). Pl. XIII, fig. 29.

*Antigonus ruptifasciata* Plötz, Jahrb. Nass. Ver. XXXVII, 27, 1884. South America.

*Timochares ruptifasciatus* Godman and Salvin, Biol. Cent.-Am., Rhop. II, 418, pl. 88, fig. 1, 2, 1896.

Draudt, Seitz's Macrolep. V, 907, pl. 177a, 1923.

The Barnes collection contains a male from Brownsville, Texas, and it may occur in other states along the Mexican border. It is more common to the south, however, and is evidently a straggler in our area.

Genus **Grais** Godman and Salvin

Orthotype *Anastrus stigmaticus* Mabille

*Grais* Godman and Salvin, Biol. Cent.-Am., Rhop II, 381, 1894.

The structure of this genus is very similar to that of the preceding, but the cell of the primaries is of almost equal width throughout and is approximately as wide as the space between itself and the costal margin. The male has neither costal fold nor tibial tuft.

1. **Grais stigmaticus** (Mabille). Pl. XIII, fig. 30.

*Anastrus stigmaticus* Mabille, Bull. Soc. Ent. Belg. XXVI, p. liv, 1883. Brazil.

*Antigonus fumosus* Plötz, Jahrb. Nass. Ver. XXXVII, 26, 1884. Brazil.

*Grais stigmaticus* Godman and Salvin, Biol. Cent.-Am., Rhop. II, 381, pl. 84, fig. 24–26, 1894.

Skinner, Trans. Am. Ent. Soc. XXVII, 208, 1911.

Draudt, Seitz's Macrolep. V, 897, pl. 175b, 1922.

Kerrville, Texas; September.

## SUBFAMILY HESPERIINAE

Palpi usually upturned, in a few genera porrect. Antennae very variable in length; club usually short and stout with a very slender apiculus but sometimes longer and sometimes with a thicker apiculus or none. Primaries more or less trigonate; secondaries trigonate to rounded and lobed. Neuration as in the Pyrginae but with the lower discocellular usually tubular and vein $M_2$ usually curved toward its base, arising nearer to $M_3$ than to $M_1$. Fore tibiae usually with the epiphysis; middle tibiae usually with conspicuous spines; hind tibiae usually with two pairs of spurs and never with a tuft. In the species of Group A the spines of the mid tibiae furnish a convenient means of separating the insects from the Pyrginae. Males often with a stigma on the primaries.

The loss of the apiculus in the Hesperiinae seems to have been brought about by its gradual reduction, a process of evolution which is nicely illustrated by the transition from *Oligoria* to *Chaerephon* in Group B. This is distinctly different from the process of reduction which has apparently occurred in the Pyrginae, but in the genera of both subfamilies which have completely lost the apiculus (e.g., *Pyrgus* and *Butleria*) the results are much the same.

In place of the two groups into which the Hesperiinae were formerly divided, a modification of the divisions used in the *Biologia Centrali-Americana* seems more logical. The North American fauna may be distributed among four groups which are characterized as follows:

Group A. Palpi porrect. Vein $M_2$ of primaries straight, intermediate between $M_1$ and $M_3$. Cell less than two-thirds as long as wing. Club of antennae blunt. *Pamphilida* and *Butleria*.

Group B. Palpi upturned; third joint long and slender. Antennae short; club blunt. Vein $M_2$ of primaries curved slightly toward $M_3$ at base. Cell less than two-thirds as long as wing. *Ancyloxypha, Oarisma, Adopaea,* and *Copaeodes.*

Group C. Palpi appressed or oblique; third joint moderate or small, long in

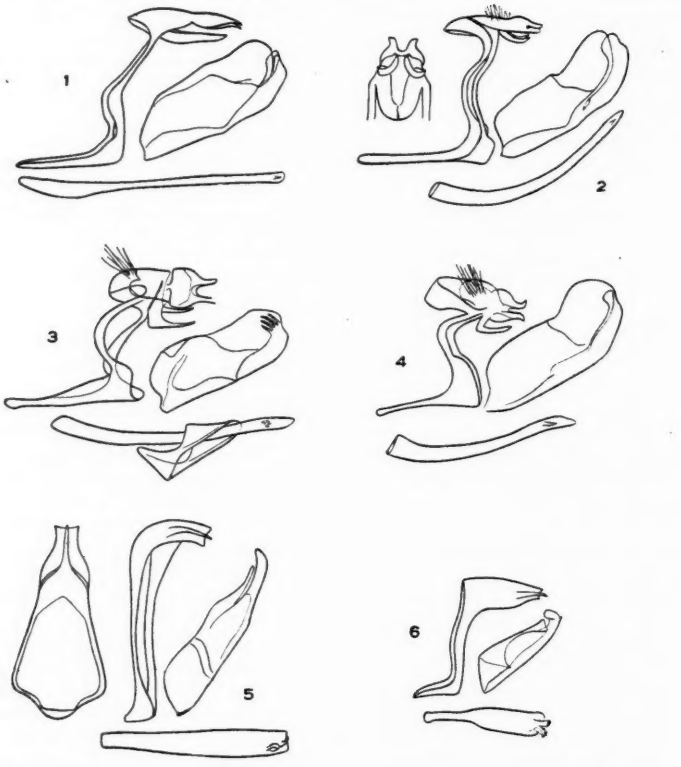




PLATE XV. MALE GENITALIA

**Fig. 1.** *Pamphilida palaemon.* **Fig. 2.** *Butleria pirus.* **Fig. 3.** *B. microsticta.* **Fig. 4.** *B. polingii.* **Fig. 5.** *Ancyloxypha numitor.* **Fig. 6.** *A. arene.*

*Amblyscirtes*. Antennae with a slender apiculus in most genera. Vein $M_2$ of primaries curved at base, usually arising much nearer to $M_3$ than to $M_1$. Cell less than two-thirds as long as wing. All North American genera not included in Groups A, B, and D.

Group D. Palpi closely appressed, smoothly and deeply scaled; third joint small. Club of antennae stout, with a fine, abruptly constricted apiculus. Vein $M_2$ arising much nearer to $M_3$ than to $M_1$; cell about two-thirds as long as wing and with at least a rudiment of a recurrent vein. *Thespieus*, *Calpodes*, and *Prenes*.

### Group A

#### Key to the Genera

Hind tibiae with one pair of spurs.....*Pamphilida*
Hind tibiae with two pairs of spurs.....*Butleria*

#### Genus **Pamphilida** Lindsey

Orthotype *Papilio palaemon* Pallas

*Pamphila* Auct., not Fabricius, 1807.
*Steropes* Auct., not Boisduval, 1832.
*Carterocephalus* Auct., not Lederer, 1852.
*Pamphilida* Lindsey, Ann. Ent. Soc. Am. XVIII, 95, 1925.

Second joint of palpi oblique, loosely clothed with long hairs; third slender, moderately long, enveloped by hairs of second. Antennae less than one-half as long as primaries; club large, elongate ovate, flattened on its posterior surface, blunt. Primaries trigonate with the outer margin rounded, rather narrow. Vein $M_2$ intermediate between $M_1$ and $M_3$. Lower discocellular not tubular, faint. Secondaries rounded, apex prominent and anal angle slightly produced. Hind tibiae with one pair of spurs; middle tibiae spined. Males without secondary sexual characters. Pl. VIII, fig. 3.

1. **Pamphilida palaemon** (Pallas). Pl. XV, fig. 1.
*Papilio palaemon* Pallas, Reisen I, 471, 1771. Europe.
*Papilio paniscus* Fabricius, Syst. Ent. 531, 1775.
*Papilio brontes* Denis and Schiffermüller, Wien. Verz. 160, 1776.
*Hesperia mandan* Edwards, Proc. Ent. Soc. Phil. II, 20, pl. V, fig. 1, 1863. Lake Winnipeg.
*Hesperia omaha* Id., op. cit. 21, 1863.
*Hesperia mingo* Id., op. cit. VI, 207, 1866.
*Hesperia mesapano* Scudder, Proc. Bost. Soc. Nat. Hist. XI, 383, 1868. Norway, Maine.
*Cyclopides skada* Edwards, Trans. Am. Ent. Soc. III, 196, 1870. Kodiak, Alaska.
*Stereoptes skada* Id., op. cit. p. 214, 1871.
*Potanthus californica* Scudder, Rept. Peabody Acad. 1871, 75 (54), 1872.
*Pamphila mandan* Id., Butt. E. U. S. II, p. 1569, 1889.
Holland, Butterfly Book 342, pl. XLVII, fig. 1, 1898.

*Potanthus omaha* Scudder, Butt. E. U. S. III, p. 1861, 1889.
† *Potanthus dara* Dyar (not Kollar), Bull. 52 U. S. N. M. 48, 1902.
*Pamphilidia palaemon* Comstock, Butt. Cal. 216, pl. 60, fig. 1, 2, 1927.

Canada, mountains of New England, and Rocky Mountains, June. California, Montana, New York. Europe and Asia. Specific records: Fort Providence, Mackenzie, July (Cary); Yukon Territory (Winn); Manitoba (Gibbon).

The names *omaha*, *mingo*, *californica*, and *dara* were based on incorrectly labelled specimens.

### Genus **Butleria** Kirby

Logotype *Carterocephalus exornatus* Felder

*Butleria* Kirby, Syn. Cat. 624, 1871.
*Dalla* Mabille, Gen. Ins. XVII, 107, 1904. Logotype *Cyclopides eryonas* Hewitson.

Very similar in structure to *Pamphilida* but with two pairs of spurs on the hind tibiae. Pl. VIII, fig. 3.

#### Key to the Species

Under surface of secondaries immaculate.....*pirus*
With a number of small pale spots.....*microsticta*
With a few large spots.....*polingii*

1. **Butleria pirus** (Edwards). Pl. XV, fig. 2.
*Pholisora pirus* Edwards, Field and Forest III, 119, 1878. South Colorado.
*Pholisora pirus* var. *semicaeca* Mabille and Boullet, Bull. Soc. Ent. France 100, 1917. Utah.
Colorado, Utah, Arizona, New Mexico; June and July.

2. **Butleria microsticta** Godman and Salvin. Pl. XV, fig. 3.
*Butleria microsticta* Godman and Salvin, Biol. Cent.-Am., Rhop. II, 464, pl. 92, fig. 1–3, 1900. Mexico.
*Dalla microsticta* Draudt, Seitz's Macrolep. V, 925, pl. 180a, 1923.

We have seen only one specimen. The species is said to occur near the Mexican border but we cannot verify its occurrence in the United States.

3. **Butleria polingii** (Barnes). Pl. XV, fig. 4.
*Pyrgus polingii* Barnes, Can. Ent. XXXII, 44, 1900. Huachuca Mts., Arizona.
*Dalla polingii* Draudt, Seitz's Macrolep. V, 925, pl. 180a, 1923. Arizona, June and July.

## GROUP B

#### Key to the Genera

1. Wings broadly rounded.....*Ancyloxypha*
Wings more or less trigonate.....2
2. All wings trigonate; male without stigma; club of antennae about as long as shaft.....*Oarisma*
Males with stigma; secondaries, at least, rounded; club not as long as shaft. 3

3. Secondaries rounded, primaries trigonate; club small..... *Copaeodes*
Outer margin of primaries more oblique and rounded; club large, relatively long..... *Adopaea*

## Genus **Ancyloxypha** Felder

Orthotype *Hesperia numitor* Fabricius

*Ancyloxypha* Felder, Verh. z.-b. Ges. Wien XII, 477, 1862.

Palpi upturned; second joint normal, deeply scaled; third slender, pointed, almost as long as second. Antennae much less than one-half as long as primaries; club blunt, moderately large. Costa of primaries rounded at base, less so in outer half; outer margin broadly rounded, cell slightly less than three-fifths as long as wing; vein $M_2$ nearer to $M_3$ than to $M_1$, $Cu_1$ and $Cu_2$ near end of cell. Secondaries rather long through cell, rounded; outer margin slightly emarginate between veins $M_1$ and $M_3$. Male without stigma. Pl. XVII, fig. 5.

1. **Ancyloxypha numitor** (Fabricius). Pl. XV, fig. 5.
*Hesperia numitor* Fabricius Ent. Syst. III, (I), 324, 1793. "In Indiis."
*Thymelicus puer* Hübner, Verz. bek. Schmett, 113, 1820.
Id., Zutr. exot. Schmett, 17, fig. 275–6, 1823.
*Heteropterus marginatus* Harris, Ins. Inj. Veg., 3rd Ed., 308, 1862. Massachusetts.
*Ancyloxipha numitor* Scudder, Butt. E. U. S. II, 1558, 1889.
*Ancyloxypha numitor* Holland, Butterfly Book 345, pl. XLVII fig. 2, 1898.
Draudt, Seitz's Macrolep. V, pl. 180c, 1923.
Atlantic Coast west to Texas, north into Canada; May to September.
The disk of the primaries is black below while that of the following species is ruddy fulvous.

1a. ab. **longleyi** French.
*Ancyloxypha longleyi* French, Can. Ent. XXIX, 80, 1897. Ridgeland, near Chicago, Illinois.
Draudt, Seitz's Macrolep. V, 927, 1923.
A fairly common form in which the primaries are entirely black above. Draudt's description of *longleyi* is puzzling. The type was added to the Barnes collection while Lindsey was curator, and proved to be only an extremely dark *numitor*.

2. **Ancyloxypha arene** (Edwards). Pl. XV, fig. 6.
*Heteroplerus arene* Edwards, Trans. Am. Ent. Soc. III, 214, 1871. Arizona.
*Copaeodes myrtis* Edwards, Papilio II, 26, 1882. Tucson, Arizona.
Holland, Butterfly Book, 346, pl. XLVII, fig. 11, 1898.
Draudt, Seitz's Macrolep. V, 928, pl. 180d, 1923.
*Apaustus leporina* Plötz, Stett. ent. Zeit. XLV, 166, 1884. Mexico.
*Apaustus euphrasia* Id., loc. cit. Mexico.
*Ancyloxypha arene* Godman, Biol. Cent.-Am., Rhop. II, 472, 1900.
Draudt, Seitz's Macrolep. V, 928, pl. 180c, 1923.
*Ancyloxypha myrtis* Godman, Biol. Cent.-Am., Rhop. II, pl. 92, fig. 35–38, 1900.

Arizona, June and August; Central America. Differs from *numitor* in the absence of black from the under surface of the primaries.

### Genus **Oarisma** Scudder

Orthotype *Hesperia powesheik* Parker

*Oarisma* Scudder, Rept. Peabody Acad. 1871, 75 (54), 1872.

*Paradopaea* Godman, Biol. Cent.-Am., Rhop. II, 469, footnote, 1900. Logotype *Hesperia garita* Reakirt.

Palpi as in *Ancyloxypha*. Antennae much less than one-half as long as primaries; club elongate ovoid, blunt, as long or nearly as long as shaft. Costa of primaries straight except at base and apex; outer margin curved only opposite cell; entire wing trigonate; cell about three-fifths as long as wing; vein $M_2$ near $M_3$ at base, $Cu_1$ near end of cell, $Cu_2$ about as far from $Cu_1$ as from base of wing, variable. Secondaries trigonate, all margins slightly rounded and anal angle very slightly lobed. Male without stigma. Pl. XVII, fig. 4.

#### Key to the Species

1. Under surface of secondaries with white veins on a dark ground before vein 1st A.....*powesheik*
   Veins not much paler than ground color.....2
2. Upper surface bright yellow-fulvous.....*edwardsii*
   Upper surface fuscous, variably powdered with yellowish fulvous scales *garita*

1. **Oarisma garita** (Reakirt). Pl. XVI, fig. 8.

   *Hesperia garita* Reakirt, Proc. Ent. Soc. Phil. VI, 150, 1866. Rocky Mountains, Colorado Terr.

   *Thymeticus hylax* Edwards, Trans. Am. Ent. Soc. III, 274, 187. Colorado.

   *Oarisma garita* Holland, Butterfly Book 343, pl. XLVII, fig. 3, 1898. Draudt, Seitz's Macrolep. V, 927, pl. 180c, ♂, 1923.

   *Paradopaea garita* Godman, Biol. Cent.-Am., Rhop. II, pl. 92, fig. 22–24, 1900.

   † *Oarisma powesheik* Godman (not Parker), Biol. Cent.-Am., Rhop. II, 469, 1900.

   † *Pholisora lena* Wright (not Edwards), Butt. W. Coast 235, pl. XXX, fig. 408, b, c, 1905.

   Manitoba to Nebraska, west and south to Idaho and Arizona; June to August.

   *Calega* Godman, which was included in the synonymy in the first edition of this paper, is probably a good species, although Godman himself referred it to *garita* in his text. Draudt's figure of the male is very poor and the shape of the wings is inaccurate; his other figures can scarcely represent this species.

2. **Oarisma edwardsii** (Barnes). Pl. XVI, fig. 7.

   *Thymelicus edwardsii* Barnes, Can. Ent. XXIX, 42, 1897. Denver, Colo.

   † *Paradopaea garita* Godman (not Reakirt), Biol. Cent.-Am., Rhop. III, pl. 92, fig. 25 (♂gen.), 1900.

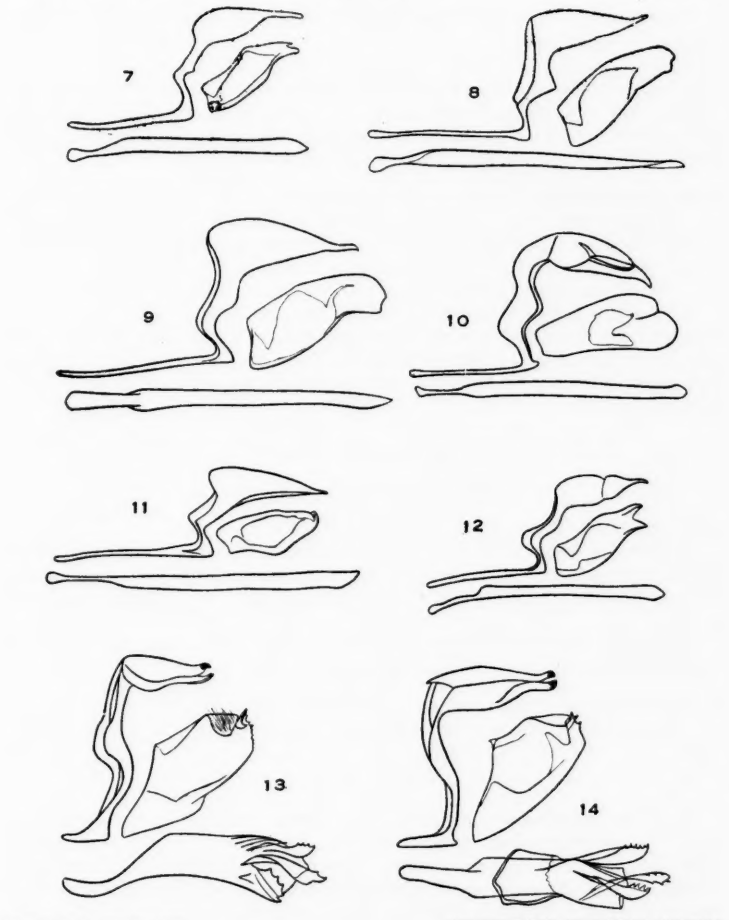




PLATE XVI. MALE GENITALIA

Fig. 7. *Oarisma edwardsii*. Fig. 8. *O. garita*. Fig. 9. *O. powesheik*. Fig. 10. *Adopaea lineola*. Fig. 11. *Copaeodes aurantiaca*. Fig. 12. *C. minima*. Fig. 13. *Chaerephon rhesus*. Fig. 14. *C. carus*.

† *Oarisma garita* Draudt (not Reakirt), Seitz's Macrolep. V, 927, pl. 180c, ♀ and U, 1923.

Texas to Arizona, north into Colorado; June and July.

The pale, bright upper surface of this species is very different from *garita*. Draudt's figure of *garita*, female, is a poor likeness of *edwardsii* and the under surface of this species is probably represented by his third figure, although it is also very poor.

3. **Oarisma powesheik** (Parker). Pl. XVI, fig. 9.

*Hesperia powesheik* Parker, Am. Ent. & Bot. II, 271, 1870. Grinnell, Iowa.
† *Thymelicus garita* Plötz (not Reakirt), Stett. ent. Zeit. XLV, 287, 1884.
*Oarisma powesheik* Scudder, Butt. E. U. S. III, p. 1859, 1889.
Holland, Butterfly Book 343, pl. XLVII, fig. 4, 1898.
Draudt, Seitz's Macrolep. V, 927, pl. 180b, 1923.

Described from thirty-one males and two females taken June 21, 1870. The species has been found in large numbers locally in Iowa in recent years, and has been taken in Michigan (Wolcott) and in Colorado and South Dakota. It flies in June and July.

## Genus **Adopaea** Billberg

Haplotype *Papilio thaumas* Hufnagel

*Adopaea* Billberg, Enum. Ins. 81, 1820.

Similar to *Copaeodes* but with the antennal club larger and relatively longer, and with a rudiment of the apiculus. The outer margin of the primaries is more oblique, relatively shorter, and more deeply sinuate. The stigma of the male is similar.

This genus was formerly used for *eunus* in our fauna; it is represented in North America only by an introduced species.

1. **Adopaea lineola** (Ochsenheimer). Pl. XVI, fig. 10.

*Papilio lineola* Ochsenheimer, Schmett. Eur. I, (2), 230, 1808. Europe.

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## Plate XVII

Fig. 1. a. Antennal club of *Chaerephon rhesus*. b. Palpus of *Pseudocopaeodes eunus*. c. Antennal club of *P. eunus*. d. Neuration of *P. eunus*. Fig. 2. Antennal clubs of *Poanes*: a. *viator*, b. *massasoit*, c. *hobomok*, d. *taxiles*, e. *melane*. Fig. 3. *Erynnis*: a. neuration of *juvenalis*; b. outer margins of wings of *funeralis*. Fig. 4. *Oarisma garita*: a. club of antenna; d. neuration. *Copaeodes aurantiaca*: b. club of antenna, c. palpus. Fig. 5. *Ancyloxypha numitor*: a. club of antenna, b. section of palpus, outer line showing limit of vestiture, c. palpus, d. neuration. Fig. 6. *Catia otho:* a. club of antenna, b. neuration. Fig. 7. Palpi: a. *Ochlodes snowi*, d. *Hesperia viridis*, e. same, denuded, f. *O. sylvanus*, in section, g. *O. napa*. Antennal clubs: b. *H. viridis* male, c. same female. Fig. 8. Antennal clubs: a. *Atrytonopsis deva*, b. *A. pittacus*, c. *A edwardsi*, f. *Oligoria maculata*, h. *Lerodea eufala*. Palpi: d. *A. deva*, g. *Amblyscirtes bellus*, i. *L. eufala*. e. Neuration at end of cell of primaries in *Lerema accius*. Fig. 9. *Megathymus streckeri*, antennal club.

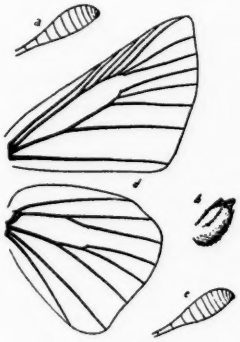

Fig.1.

Fig. 2.

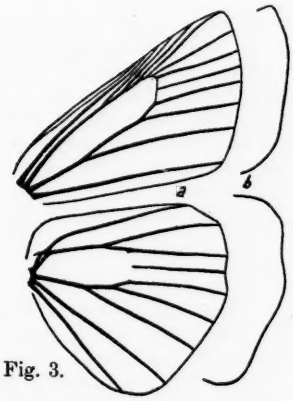

Fig. 3.

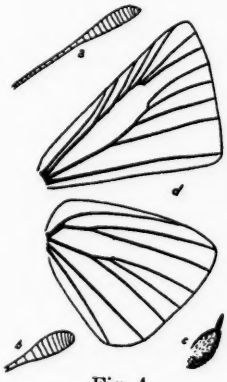

Fig. 4.

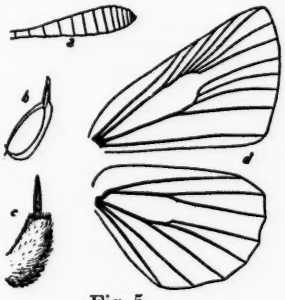

Fig. 5.

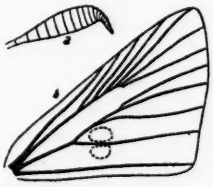

Fig. 6.

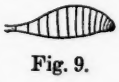

Fig. 9.

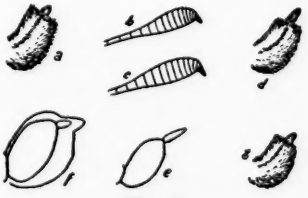

Fig. 7.

Fig. 8.

*Adopaea lineola* Spuler, Schmett. Eur. pl. 18, fig. 6a, 6b, 1910.
*Adopaea* (*Pamphila*) *lineola*, 47th Rept. Ent. Soc. Ont. 142, 1917.

Introduced from Europe. The reference in the report of the Entomological Society of Ontario records its capture at London, Ont., on July 1, 1910, and in succeeding years. Dr. G. W. Rawson of Detroit, Michigan, has kindly supplied us with data on the occurrence of the species near that city from the middle of June to the end of July in recent years; he has also taken one female at Findlay, Ohio.

## Genus **Copaeodes** Speyer

Logotype *Heteropterus procris* Edwards

*Copaeodes* Speyer, Edward's Cat. Lep. 49, 64, 1877.

Palpi upturned; second joint densely scaled; third fine, pointed, not quite so long as in *Ancyloxypha*. Antennae scarcely two-fifths as long as primaries; club rather small, stout, blunt. Primaries trigonate; costa straight except at base and apex; outer margin slightly sinuate; anal angle almost rectangular. Secondaries rounded, slightly lobed at anal angle. Wings more elongate in female. Primaries of male with a slender longitudinal stigma. Cell of primaries about three-fifths as long as wing; vein $M_2$ arising much nearer to $M_3$ than to $M_1$. Pl. XVII, fig. 4.

1. **Copaeodes aurantiaca** (Hewitson). Pl. XVI, fig. 11.
*Ancyloxipha aurantiaca* Hewitson, Desc. Hesp. 45, 1868.
*Hesperia waco* Edwards, Trans. Am. Ent. Soc. II, 122, 1868. Waco, Texas.
*Heteropterus procris* Edwards, op. cit. 215, 1871. (In part). Waco, Texas.
*Thymelicus macra* Plötz, Stett. ent. Zeit. XLV, 284, 1884. North America.
† *Thymelicus singularis* Id. (not Herrich-Schaeffer), op. cit. 284, 1884.
*Copaeodes candida* Wright, Proc. Cal. Acad. Sci. (2), III, 34, 1890. San Bernardino Valley, California.
Id., Butt. W. Coast 409, pl. XXX, fig. 411, b, c, 1905.
† *Copaeodes nanus* Watson (not Herrich-Schaeffer), Proc. Zool. Soc. London 98, 1893.
*Copaeodes procris* Holland, Butterfly Book 345, pl. XLVII, fig. 9, 1898.
Wright, Butt. W. Coast 236, pl. XXX, fig. 409, b, c, 1905.
*Copaeodes aurantiaca* Godman, Biol. Cent.-Am., Rhop. II, 473, pl. 92, fig. 39–42, 1900.
Comstock, Butt. Cal. 216, pl. 60, fig. 3–5, 1927.
*Copaeodes singularis* Draudt, Seitz's Macrolep. V, 928, pl. 180d, 1923.

Arizona, May, July to September; Texas and California, March, May, and August. New Mexico, April and July.

After a checkered career, the synonymy of these two species of *Copaeodes* seems to be definitely settled; their distinctness is no longer subject to doubt.

2. **Copaeodes minima** (Edwards). Pl. XVI, fig. 12.
*Hesperia minima* Edwards, Trans. Am. Ent. Soc. III, 196, 1870. Waco, Texas.
*Heteropterus procris* Id., op. cit. II, 215, 1871. (In part.)

† *Copaeodes aurantiaca* Godman (not Hewitson), Biol. Cent.-Am., Rhop. II, 473, pl. XCII, fig. 39–42, 1900.

*Copaeodes rayata* Barnes and McDunnough, Contributions II (3), 100, pl. III, fig. 1, 2, 1913.

Florida, March; Alabama, July and August (Dukes); Arkansas, September (Knobel); San Benito, Texas, June and July.

The veins on the under surface of the secondaries are distinctly darker than the ground color and are of a rusty color. The space between the medians on this surface is usually occupied by a distinct pale stripe, but in worn specimens the stripe may be scarcely evident.

## GROUP C

### Key to the Genera

1. Club of antennae blunt or with a rudiment of the apiculus.....2
   Club of antennae with a sharp apiculus, sometimes very short.....3
2. Ground color bright yellow-fulvous.....*Pseudocopaeodes*
   Ground color never yellow-fulvous.....*Chaerephon*
3. Vein $M_2$ of primaries well curved toward base, arising much nearer to $M_3$ than to $M_1$.....4
   $M_2$ only slightly curved, a little nearer to $M_3$ than to $M_1$ at its origin....12
4. Antennae scarcely longer than width of thorax.....*Hylephila*
   Antennae distinctly longer.....5
5. Mid tibiae with spines.....6
   Mid tibiae without spines.....*Problema, Atrytone*
6. Apiculus of antennae shorter than thickness of club or not sharply constricted.....7
   Apiculus at least as long as thickness of club, slender, either abruptly constricted or distinctly longer than thickness of club.....10
7. Primaries apically produced and secondaries lobed; apiculus very short.....8
   Primaries and secondaries moderate; apiculus usually moderately long.....9
8. Male stigma slender; wings of female less strongly lobed, more rounded *Hesperia*
   Male stigma a large blotch; wings of female much like those of male *Atalopedes*
9. Vein $Cu_2$ of primaries slightly nearer to base of wing than to $Cu_1$. Secondaries well marked with yellow-fulvous; see description.....*Ochlodes*
   Vein $Cu_2$ variably nearer to $Cu_1$; when doubtful, secondaries with little fulvous, at the most a transverse band. See description.....*Talides*
   Vein $Cu_2$ immaterial. Club of antennae very stout, with a fine apiculus or moderate with a thick apiculus.....*Poanes*
10. Apiculus slender, about twice thickness of club.....*Oligoria*
    Apiculus shorter or thick.....11
11. Apiculus slender; male stigma large, with large gray scales; under surface fuscous.....*Catia*
    Apiculus tapered, not abruptly constricted; male without stigma; under surface not fuscous.....*Poanes*

Apiculus slender, variable; male stigma variable. Under surface gray-powdered to dark brown.....*Atrytonopsis*

12. Apiculus fine, shorter than thickness of club.....*Lerodea*
Apiculus longer, or wings immaculate.....13

13. Third joint of palpi long in most species; fringes in most species checkered or contrasting sharply with ground color of wings; *oslari* grayish with little trace of other color.....*Amblyscirtes*
One species only; third joint of palpi not long, fringes neither checkered nor contrasting; under surface with purplish luster.....*Lerema*

Genus **Pseudocopaeodes** Skinner and Williams

Orthotype *Copaeodes eunus* Edwards

*Pseudocopaeodes* Skinner and Williams, Trans. Am. Ent. Soc. XLIX, 137, 1923.

The original description states that the type of this genus differs from the species of *Chaerephon* in color and in shape and pattern of the male genitalia. Its true status will probably have to be decided in connection with studies of the tropical fauna, since there are so few North American species in the two genera. The one species of *Pseudocopaeodes* is easily recognized by its superficial characters; its structure is in general like that of *Chaerephon*. Pl. XVII, fig. 1.

1. **Pseudocopaeodes eunus** (Edwards). Pl. XVIII, fig. 15.
*Copaeodes eunus* Edwards, Papilio I, 47, 1881. Mt. Hood, Oregon.
Wright, Butt. W. Coast 237, pl. XXX, fig. 414, b, c, all ♀, 1905.
Draudt, Seitz's Macrolep. V, 928, pl. 180e, 1923.
*Copaeodes wrightii* Edwards, Can. Ent. XIV, 152, 1882. Mohave Desert, Cal.
Draudt, Seitz's Macrolep. V, 928, pl. 180d, 1923.
*Copaeodes wrighti* Holland, Butterfly Book, pl. XLVII, fig. 10, 1898.
Wright, Butt. W. Coast 237, pl. XXX, fig. 412, b, c, 1905.
*Pseudocopaeodes eunus* Comstock, Butt. Cal. 217, pl. 60, fig. 6–9, 1927.
California, June and September; Nevada, June.

Genus **Chaerephon** Godman

Orthotype *Pamphila citrus* Mabille

*Chaerephon* Godman, Biol. Cent.-Am., Rhop. II, 474, 1900.

Second joint of palpi upturned, deeply scaled; third small, oblique, smooth. Antennae less than one-half as long as primaries; club large, obovoid, subacute but without reflexed apiculus. Costa of primaries straight except at base; apex produced, rounded, acute in males, less sharp in females; outer margin rounded in center and straighter near apex and anal angle, though almost evenly rounded in some females. Secondaries rounded, lobed at anal angle in male, slightly so in female. Both wings appear shorter and broader in the male than in the female. Primaries of male with a faint stigma composed of an oblique bar above vein $Cu_2$ followed by two small round patches below the vein, in line. In *carus* there is sometimes a fourth well-marked patch in the cell. The stigma varies greatly even in a single species. It is best developed in *carus* and least in *simius*. Pl. XVII, fig. 1.

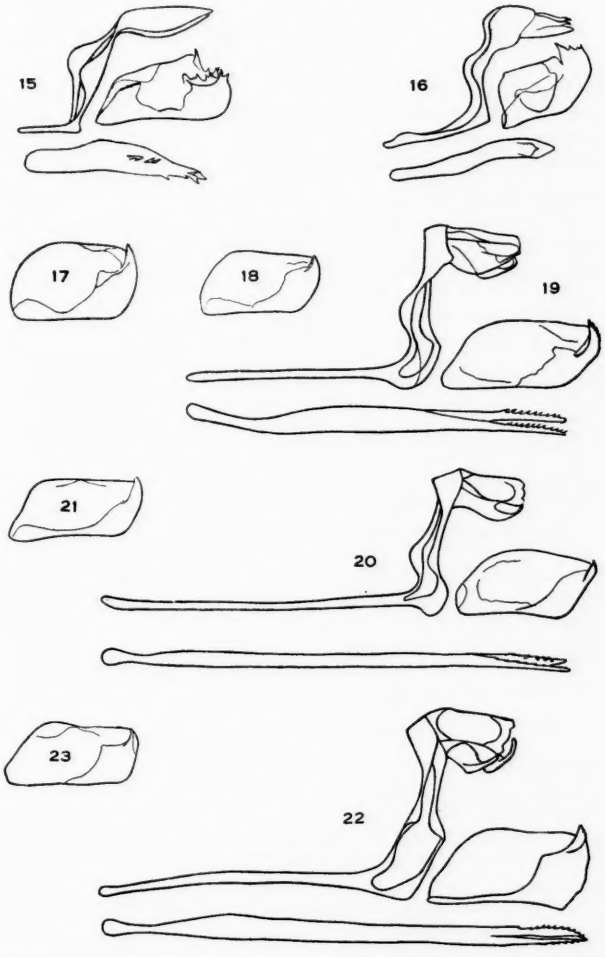




PLATE XVIII. MALE GENITALIA

Fig. 15. *Pseudocopaeodes eunus*. Fig. 16. *Chaerephon simius*. Fig. 17. *Amblyscirtes vialis*. Fig. 18. *A. alternata*. Fig. 19. *A. hegon*. Fig. 20. *A. nereus*. Fig. 21. *A. nysa*. Fig. 22. *A. textor*. Fig. 23. *A. eos*.

KEY TO THE SPECIES

1. Under surface gray, powdery.....*simius*
   Under surface more or less yellowish.....2
2. Yellow of under surface of secondaries interspersed with dark patches; maculation distinct.....*rhesus*
   Yellow pale, dull, even; maculation obscure.....*carus*

1. **Chaerephon rhesus** (Edwards). Pl. XVI, fig. 13.
   *Pamphila rhesus* Edwards, Field and Forest III, 116, 1878. S. Colorado.
   *Hesperia axius* Plötz, Stett. ent. Zeit. XLIV, 213, 1883. Colorado.
   *Chaerephon rhesus* Godman, Biol. Cent.-Am., Rhop. II, 475, pl. 93, figs. 5–7, 1900.
   Draudt, Seitz's Macrolep. V, 928, pl. 180e, 1923.
   Colorado, Arizona, New Mexico, in May; Mexico.

2. **Chaerephon carus** (Edwards). Pl. XVI, fig. 14.
   *Pamphila carus* Edwards, Can. Ent. XV, 34, 1883. West Texas.
   *Erynnis carus* Draudt, Seitz's Macrolep. V, 930, 1923.
   Texas, New Mexico, and Arizona, April to September.

3. **Chaerephon simius** (Edwards). Pl. XVIII, fig. 16.
   *Amblyscirtes simius* Edwards, Trans. Am. Ent. Soc. IX, 6, 1881. Oak Creek Canyon and Pueblo, Colorado.
   Holland, Butterfly Book 341, pl. XLVII, fig. 8, 1898.
   *Stomyles simius* Draudt, Seitz's Macrolep. V, 943, pl. 183b, 1924.
   Arizona, June; New Mexico, August; Colorado; Sioux County, Nebraska, July (Leussler).
   Draudt's figures are very poor; they may represent *Amblyscirtes cassus*.

## Genus **Hesperia** Fabricius

Logotype *Papilio comma* Linnaeus

*Hesperia* Fabricius, Ent. Syst. III (I), 258, 1793.
Barnes and Lindsey, Ann. Ent. Soc. Am. XV, 94, 1922.
Lindsey, Ann. Ent. Soc. Am. XVIII, 89, 1925.
*Pamphila* Fabricius, Ill. Mag. VI, 287, 1807. Logotype *Papilio comma* Linnaeus.
*Ocytes* Scudder, Rept. Peabody Acad. 1871, 76 (55), 1872. Orthotype *Hesperia metea* Scudder.
*Anthomaster* Scudder, Rept. Peabody Acad. 1871, 78 (57), 1872. Orthotype *Hesperia leonardus* Harris.

Palpi upturned, second joint with a smooth vestiture of scales and hairs; third about one-half as long as second but partly concealed. Antennae less than one-half as long as primaries; club large with a very small apiculus which is a little longer in the female than in the male. Costa of primaries slightly emarginate to slightly convex; outer margin slightly sinuate to evenly rounded, more rounded in the female. Secondaries rounded, slightly lobed at anal angle. In all of the species the wings of the female are longer and more rounded than those of the male. Vein $M_2$ of primaries arising very near to $M_3$; $Cu_1$ near end of cell; $Cu_2$

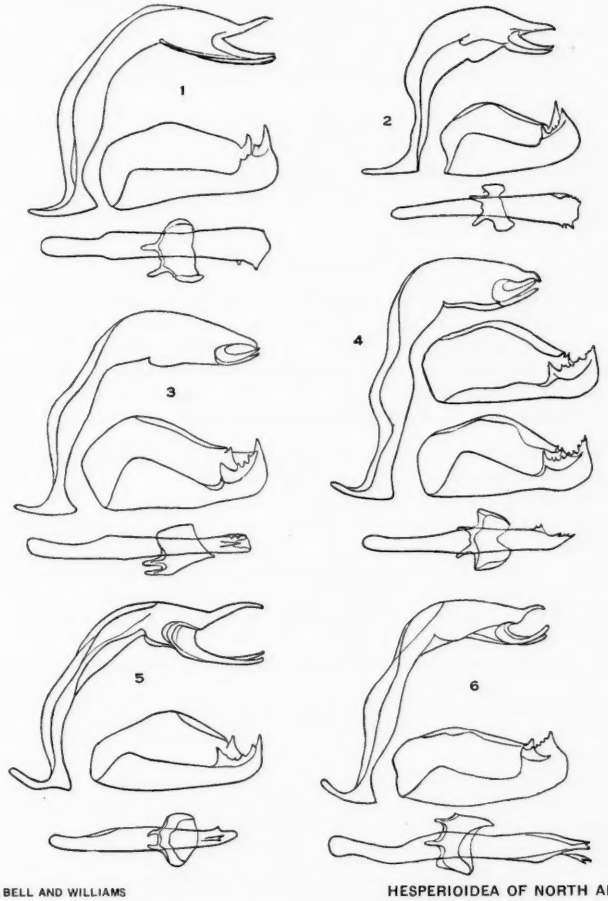




PLATE XIX. MALE GENITALIA OF *Hesperia*

**Fig. 1.** *meskei*. **Fig. 2.** *attalus*. **Fig. 3.** *ottoe*. **Fig. 4.** *leonardus*. **Fig. 5.** *sassacus*. **Fig. 6.** *dacotae*.

about intermediate between $Cu_1$ and base of wing; cell slightly over three-fifths as long as wing. Vein R of secondaries slightly nearer to end of cell than to SC. Mid tibiae spiny. Male stigma slender, strong, extending from base of vein $Cu_1$ to basal third of A and made up of a long piece in front of vein $Cu_2$ and a shorter piece behind, which is set outside of the first but is continuous with it. Pl. XVII, fig. 7.

The use of the name *Hesperia* for this genus has already caused enough comment to foreshadow additional disagreement. It is, however, merely the restoration of a valid usage which was discarded without adequate reason after standing for half of a century, and we are unanimously agreed that the step is desirable.

## Key to the Species

This key is not to be regarded as a means of ultimate identification; in *Hesperia* no key can be sufficient in itself, for many of our species and forms can only be separated by a practiced eye. The key to the forms of *comma* is based on specimens in the Barnes collection which have been compared with the types, and may be relied upon for typical specimens. It will not, however, suffice for the identification of the multitude of atypical specimens which appear in any large series.

1. Under surface of secondaries with uneven ground color including greenish or greenish-yellow patches; veins white on disk.....2
   Under surface evenly colored; veins not white.....3
2. Ground color of under surface of secondaries with greenish and fuscous patches. Spots on upper surface usually restricted.....*uncas*
   Ground color very pale, without fuscous patches. Spots of upper surface diffuse, extended. Entire insect pale and of large size.....*lasus*
3. Upper surface fuscous with reduced poorly defined pale spots; under surface of secondaries with a pale band.....*metea*
   Upper surface more or less fulvous or with well defined spots, or lower surface with separate spots.....4
4. Under surface of secondaries yellow to brown with an oblique band of uniform confluent white spots posterior to vein $M_1$; sometimes with a single spot before this band.....*columbia*
   Spots making up band, when present, not confluent; either unequal, irregularly placed, or with more than one spot before $M_1$. Under surface usually greenish in forms which are likely to confuse.....5
5. Under surface of secondaries with sharply defined white spots, or yellowish to greenish, with the bent macular band traceable.....6
   Under surface without sharply defined white spots; immaculate or with traces of separate spots, usually poorly defined or not white.....14
6. Under surface warm brown; spots variable in number, usually heaviest toward costa, white, sharply defined.....*dodgei*
   Under surface otherwise.....7
7. Under surface of primaries fuscous; spots on secondaries small and rounded *seminole*
   Under surface of primaries with some fulvous or spots on secondaries otherwise.....8

8. Spot on under surface of secondaries just behind vein $Cu_2$ nearer base of wing than rest of band or absent. Band sometimes too much modified to show this difference ..... 9
   This spot on a line with rest of band or outside of it; band well marked, white ..... *viridis*
9. Spots not confluent, their size variable; under surface usually dark, with sparse over-scaling ..... *woodgatei*
   Spots usually confluent or overscaling dense ..... 10
10. Upper surface bright, with sharp contrasts; costal area of primaries fulvous; white spots of lower surface very large and bright ..... *juba*
    Upper surface with a variable diffusion of fuscous; when maculation is sharp, the other characters differ. Spots below moderate to greatly reduced, white or yellowish ..... 11
11. Maculation below yellow but not reduced ..... *sassacus*, 13
    Maculation white or greatly reduced ..... 12
12. Macular band with one spot before vein R, one behind $Cu_2$ followed by a trace of a second; band irregular; superficial vestiture gray-green .. *nevada*
    Band equally contrasting but more regular and abbreviated, usually with no spot before R and only one reduced spot behind $Cu_2$; superficial vestiture green ..... *colorado*
    Spots dull white; superficial vestiture golden brown ..... *manitoba*
    Under surface of secondaries very smooth in appearance, yellow; spots white ..... *idaho*
    Spots greatly reduced, white ..... *assiniboia*
    Spots greatly reduced, yellowish ..... *oregonia*
13. Under surface of secondaries pale; maculation faint ..... *sassacus*
    Under surface dark, spots contrasting ..... *sassacus manitoboides*
14. Under surface of secondaries dark red-brown with pale cream-white spots *leonardus*
    Under surface otherwise ..... 15
15. Upper surface with maculation extended, diffuse. Spots on under surface of secondaries pale yellowish. Faint dark dots in fringe at ends of veins in most specimens ..... *lindseyi*
    Not such species ..... 16
16. Pale maculation above very diffuse; pale area in end of cell of primaries showing two pale nuclei, always vague ..... *dacotae*
    Cell of primaries with two sharply defined spots in end, or with these indistinguishably fused ..... 17
17. Under surface of secondaries yellow-fulvous, with or without vague traces of large spots ..... *meskei*
    Under surface of a lighter shade, more or less yellow; spots small or absent ..... 18
18. Southern species; Florida, Texas, Ohio? ..... *attalus*
    Prairie species; Iowa and the Dakotas west to California *ottoe*, *pawnee*, race *ogallala*, race *montana*

1. **Hesperia uncas** Edwards. Pl. XX, fig. 7.
   *Hesperia uncas* Edwards, Proc. Ent. Soc. Phil. II, 19, pl. V, fig. 3, 1863. Philadelphia.

*Hesperia ridingsii* Reakirt, Proc. Ent. Soc. Phil. VI, 151, 1866. Rocky Mountains, Colorado Terr.
*Erynnis uncas* Scudder, Butt. E. U. S. III, p. 1862, 1889.
Holland, Butterfly Book 349, pl. XLVII, fig. 27, 28, 1898.
Draudt, Seitz's Macrolep. V, 930, pl. 180k, 1924.

Manitoba, August, south and west to Kansas and Arizona, where it flies in June and July.

The locality Philadelphia given by Edwards in the original description is probably erroneous; the species has not been taken to our knowledge east of Kansas. Draudt's figure of the female is fairly good but that of the male is poor.

1a. form **lasus** Edwards.
*Pamphila lasus* Edwards, Papilio IV, 54, 1884. Southern Arizona.

*Lasus* was taken in abundance in July, 1922, in Utah. We regard it as a desert form of *uncas*, although it may prove to be a closely related but distinct species. It is larger and much paler than *uncas*, with little or no trace of fuscous on either surface, and is strikingly different in superficial appearance.

2. **Hesperia licinus** (Edwards).
*Pamphila licinus* Edwards, Trans. Am. Ent. Soc. III, 275, 1871. Near Waco, Texas.

This species is still known only from the type.

3. **Hesperia metea** Scudder. Pl. XX, fig. 8.
*Hesperia metea* Scudder, Proc. Essex Inst. III, 177, 1862. Connecticut.
*Erynnis metea* Id., Butt. E. U. S. II, p. 1650, 1889.
Holland, Butterfly Book 348, pl. XLVII, fig. 33, 34, 1898.
Draudt, Seitz's Macrolep. V, 930, pl. 180i, 1924.

Massachusetts to New Jersey, May and June.

This species is readily distinguished by its dark color, vague, whitish maculation, and the tendency of the macular band on the under surface of the secondaries to be produced along the veins. The spots making up this band are neither separate nor very bright as in other dark colored species.

4. **Hesperia columbia** (Scudder). Pl. XXI, fig. 15.
*Pamphila columbia* Scudder, Rept. Peabody Acad. 1871, 77 (56), 1872. California.
† *Pamphila sylvanoides* Scudder (not Boisduval), Mem. Bost. Soc. Nat. Hist. II, (3), 351, pl. X, fig. 22 (type), pl. XL, fig. 15, 17, 1874.
*Pamphila californica* Wright, Butt. W. Coast 241, pl. XXXI, 423, 1905.
*Thymelicus erynnioides* Dyar, Jn. N. Y. Ent. Soc. XV, 50, 1907. Monterey Co., Cal.
*Erynnis columbia* Draudt, Seitz's Macrolep. V, 929, pl. 180h, 1924.
*Hesperia columbia* Comstock, Butt. Cal. 217, pl. 60, fig. 11, 12, 1927.

California, April and October; Arizona.

The band on the under surface of the secondaries is very even as a rule, but may be reduced toward the anal angle. Draudt's figures are not recognizable as *columbia*.

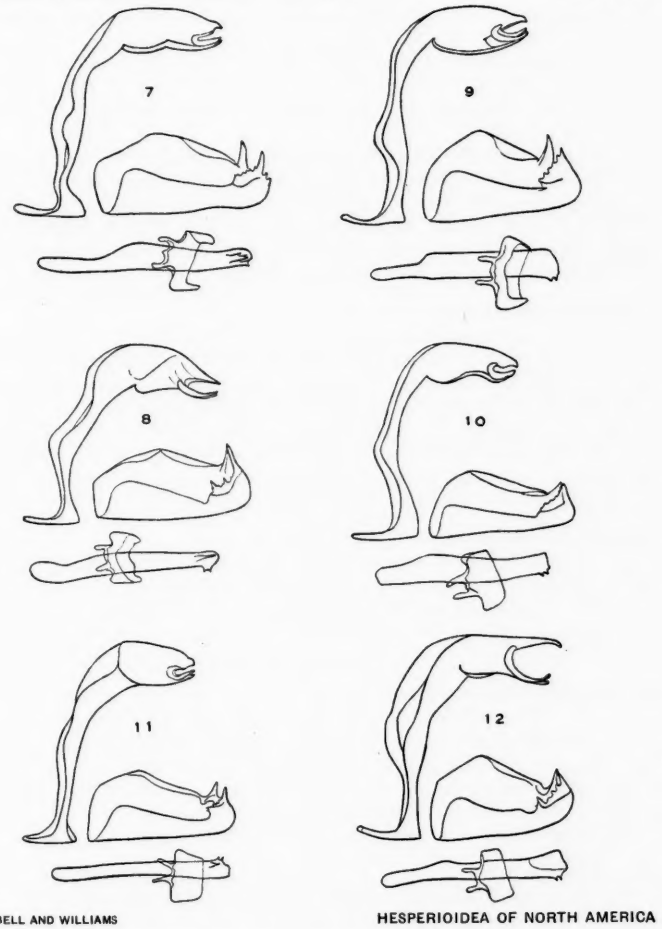




PLATE XX. MALE GENITALIA OF *Hesperia*

Fig. 7. *uncas*. Fig. 8. *metea*. Fig. 9. *comma*, from Switzerland. Fig. 10. *comma* from Colorado. Fig. 11. *juba*. Fig. 12. *viridis*.

5. **Hesperia nevada** (Scudder). Pl. XXI, fig. 16, 22.

*Pamphila nevada* Scudder, Mem. Bost. Soc. Nat. Hist. II, 347, pl. X, fig. 1–4, pl. XI, fig. 3, 4, 1874. Colorado, Oregon.

† *Pamphila viridis* Wright (not Edwards), Butt. W. Coast 239, pl. XXX, fig. 418c, 1905.

† *Pamphila colorado* Id., (not Scudder), op. cit. 240, pl. XXX, fig. 421, b, c, 1905.

*Erynnis comma form nevada* Draudt, Seitz's Macrolep. V, 929, pl. 180g, 1924.

*Hesperia nevada* Comstock, Butt. Cal. 219, pl. 60, fig. 23, 25, 1927.

There is now no doubt of the validity of this species, which was listed as a form of *comma* for many years. It ranges from Canada to Arizona in the western part of the continent, flying from June to August. Our most easterly records are from Miniota, Manitoba (Gibbon), and Colorado.

6. **Hesperia comma** (Linnaeus). Pl. XX, fig. 9, 10.

*Papilio comma* Linnaeus, Syst. Nat. 484, 1758.

*Comma* is a European species. The opinion has been expressed by other writers on the North American fauna that it occurs on this continent, and we agree that Labrador specimens may properly be regarded as typical.

Draudt's figures of the various named forms are almost unrecognizable, and are certainly not to be depended upon for the identification of specimens. We are therefore omitting citation of these references save where we disagree in the ranking of names. *Manitoba* alone is fairly well represented.

6a. race **colorado** Scudder. Pl. XXI, fig. 19.

*Pamphila colorado* Scudder, Mem. Bost. Soc. Nat. Hist. II, 349, pl. X, fig. 16, 17, 18, pl. XL, fig. 1, 2, 1874. Colorado.

California; Arizona north to Washington. June to September.

In the typical form the under surface of the secondaries is bright green with the band pure white, short, rather even, and the basal marks united to form a U.

6b. race **manitoba** Scudder.

*Pamphila manitoba* Scudder, Mem. Bost. Soc. Nat. Hist. II, 351, pl. X, fig. 8–11, pl. XI, fig. 7, 8, 1874. Colorado and Canada.

*Erynnis manitoba* Id., Butt. E. U. S. II, p. 1646, 1889.

*Pamphila manitoba* var. *laurentina* Lyman, Can. Ent. XXIV, 59, 1892.

Northwestern United States and Canada; Alaska, July.

The typical form is golden brown beneath with whitish maculation.

6c. race **idaho** Edwards.

*Pamphila colorado* var. *idaho* Edwards, Can. Ent. XV, 148, 1883. Oregon, Washington, California.

*Hesperia comma idaho* Comstock, Butt. Cal. 218, pl. 60, fig. 13–15, 1927.

Wyoming to California, north into Canada; July to September.

The smooth yellowish appearance of the under surface of the secondaries is characteristic. The spots are slightly edged with fuscous in some specimens.

6d. race **assiniboia** Lyman.

*Pamphila manitoba* var. *assiniboia* Lyman, Can. Ent. XXIV, 59, 1892. Regina, Canada.

Manitoba, September.

This race is more restricted in distribution and is one of the most distinctly marked. The key separates it satisfactorily.

7. **Hesperia oregonia** (Edwards). Pl. XXI, fig. 14, 21.

*Pamphila oregonia* Edwards, Can. Ent. XV, 150, 1883. California and Nevada.

*Erynnis comma* form *oregonia* Draudt, Seitz's Macrolep. V, 929, pl. 180h, 1924.

*Hesperia comma oregonia* Comstock, Butt. Cal. 218, pl. 60, fig. 19, 1927.

Nevada west to the coast and north into Canada, June and July.

The maculation of the under surface is similar in form to that of *assiniboia* but is yellowish instead of white, and the ground color of the wing is yellowish to yellowish brown. Although formerly treated as a form of *comma* this species proves to be genitalically distinct.

8. **Hesperia lindseyi** (Holland).

*Pamphila lindseyi* Holland, Ann. Carnegie Mus. XIX, 158, 1930. Nellie and Ukiah, California.

† *Pamphila idaho* Wright (not Edwards), Butt. W. Coast 241 (in part), pl. XXXI, fig. 422b, 1905.

† *Pamphila ruricola* Wright (not Boisduval), op. cit. 238, pl. XXX, fig. 416, 1905.

Comstock, Butt. Cal. 219, pl. 61, fig. 1–3, 1927.

This species ranges northward through California and probably into Oregon and Nevada; it is fairly common in July in the Warner Mountains of California, near the northeastern corner of the state, at 5000 feet. While it is quite variable, the tendency of the spots to be prolonged on the veins and the somewhat diffuse maculation give the species a strikingly different appearance which is usually easy to recognize.

9. **Hesperia dodgei** (Bell). Pl. XXV, fig. 7.

*Pamphila juba* race *dodgei* Bell, Jn. N. Y. Ent. Soc. XXXV, 175, 1927. Santa Cruz, California.

Although it was described as a race of *juba* we believe *dodgei* to be distinct from that species. The peculiar brown under surface of the secondaries readily separates this species from the others in the group. So far it is known only from the vicinity of Santa Cruz, California, where it flies during the latter part of August and in September.

10. **Hesperia juba** (Scudder). Pl. XX, fig. 11.

† *Hesperia comma* Boisduval (not Linnaeus), Ann. Soc. Ent. France (2), X, 313, 1852. California.

*Pamphila juba* Scudder, Rept. Peabody Acad. 1871, 77 (56), 1872. Id., Mem. Bost. Soc. Nat. Hist. II, 349, pl. X, fig. 19, 20, pl. XI, fig. 5, 6, 1874. Wright, Butt. W. Coast 239, pl. XXX, fig. 417, 1905.

† *Pamphila viridis* Wright (not Edwards), Butt. W. Coast, pl. XXX, fig. 418b, 1905.

*Erynnis comma* form *juba* Draudt, Seitz's Macrolep. V, 929, 1924.

*Hesperia juba* Comstock, Butt. Cal. 218, pl. 60, fig. 16–18, 1927.

Northern California south to Mexico and east to Colorado, June to September.

11. **Hesperia woodgatei** (Williams). Pl. XXI, fig. 13.
*Pamphila woodgatei* Williams, Ent. News XXV, 266, 1914. Jemez Mts., New Mexico.
Texas, New Mexico, and Arizona; September and October.

12. **Hesperia viridis** (Edwards). Pl. XX, fig. 12; pl. XXI, fig. 20.
*Pamphila juba* var. *viridis* Edwards, Can. Ent. XV, 147, 1883. Las Vegas, New Mexico.
*Erynnis comma* form *viridis* Draudt, Seitz's Macrolep. V, 929, pl. 180g, 1924.
*Hesperia viridis* Comstock, Butt. Cal. 219, pl. 60, fig. 20–22, 1927.
Colorado and the border states, June to October.
The form of the macular band as mentioned in the key is unique and apparently constant. Draudt's figure bears no distinctive resemblance to the species.

13. **Hesperia leonardus** Harris. Pl. XIX, fig. 4.
*Hesperia leonardus* Harris, Ins. Inj. Veg. 3rd Ed. 314, fig. 138, 1862. Massachusetts.
*Anthomaster leonardus* Scudder, Butt. E. U. S. II, p. 1673, 1889.
*Erynnis leonardus* Holland, Butterfly Book 349, pl. XLVII, fig. 35, 36, 1898.
*Ochlodes leonardus* Draudt, Seitz's Macrolep. V, 934, pl. 181g, h, 1924.
Massachusetts south to North Carolina, west to the Mississippi; occasional in eastern Iowa; August and September. Scudder recorded it from Ontario and Florida, the latter in March and April.

14. **Hesperia cabelus** (Edwards).
*Pamphila cabelus* Edwards, Trans. Am. Ent. Soc. IX, 4, 1881. Nevada.
This is another of our lost species of *Hesperia*. Apparently it belongs in this part of the genus but we can add nothing to the knowledge of ten years ago.

15. **Hesperia harpalus** (Edwards).
*Pamphila harpalus* Edwards, Trans. Am. Ent. Soc. IX, 3, 1881. Nevada.
The same may be said of this species as of the preceding.

16. **Hesperia attalus** (Edwards). Pl. XIX, fig. 2.
*Pamphila attalus* Edwards, Trans. Am. Ent. Soc. III, 276, 1871. Waco, Texas.
*Ocytes seminole* Scudder, Rept. Peabody Acad. 1871, 76 (55), 1782. Florida.
*Erynnis attalus quaiapen* Scudder, Butt. E. U. S. II, p. 1655, 1889.
*Erynnis attalus* Scudder, Butt. E. U. S. II, p. 1653, 1889.
Holland, Butterfly Book 349, 1898.
Draudt, Seitz's Macrolep. V, 930, pl. 180k, 1924.
*Pamphila slossonae* Skinner, Ent. Amer. VI, 138, 1890. Florida.
*Attalus* is known to occur in New Jersey, Florida, Alabama, and Texas from March to May and in August and September. Scudder mentions records from Wisconsin and Iowa, and the Barnes collection contains specimens labelled Ohio. We regard the middle western records as extremely doubtful.
The species varies extremely in depth of color and extent of markings, but we do not feel that *seminole*, long regarded as a form or race, is sufficiently distinct to justify the retention of the name.

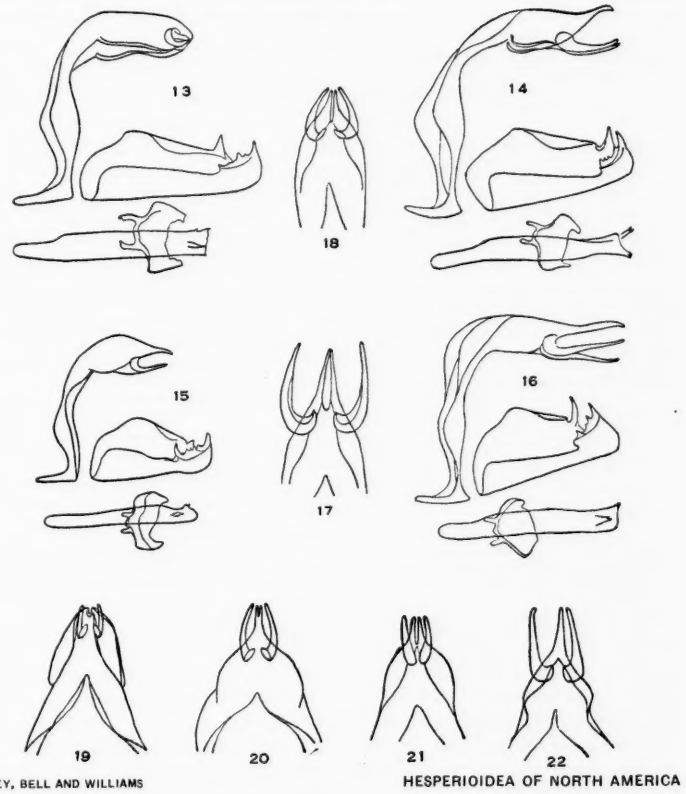




PLATE XXI. MALE GENITALIA OF *Hesperia*

Fig. 13. *woodgatei*. Fig. 14. *oregonia*. Fig. 15. *columbia*. Fig. 16. *nevada*. Fig. 17. *sassacus*. Fig. 18. *dacotae*. Fig. 19. *comma colorado*. Fig. 20. *viridis*. Fig. 21. *oregonia*. Fig. 22. *nevada*.

17. **Hesperia meskei** (Edwards). Pl. XIX, fig. 1.

*Pamphila meskei* Edwards, Can. Ent. IX, 58, 1877. Bastrop Co., Texas.
*Pamphila straton* Edwards, Papilio I, 78, 1881. Florida.
*Ochlodes meskei* Draudt, Seitz's Macrolep. V, 934, 1924.

Florida and Texas, May; North Carolina, June.

*Meskei* resembles well-marked *attalus* on the upper surface; on the underside the secondaries are yellow-fulvous, immaculate in some specimens and with a trace of large diffuse pale spots in others.

18. **Hesperia ottoe** Edwards. Pl. XIX, fig. 3.

*Hesperia ottoe* Edwards, Proc. Ent. Soc. Phil. VI, 207, 1866. Kansas.
*Pamphila ottoe* Scudder, Mem. Bost. Soc. Nat. Hist. II, 348, pl. X, fig. 6, pl. XI, fig. 13, 1874.
*Erynnis ottoe* Draudt, Seitz's Macrolep. V, 930, pl. 180i, 1924.

In the typical form the males are tawny above with a very narrow terminal border of fuscous and typical specimens in the Barnes collection have the under surface bright yellow. It is apparently a rare form of the species and rather widely scattered, since the specimens in the Barnes collection are from Montana. Draudt's form *amanda* is not related; his figures suggest *Telicota* or *Padraona* rather than American genera.

18a. form **pawnee** Dodge.

*Hesperia pawnee* Dodge, Can. Ent. VI, 44, 1874. Dodge Co., Nebraska.
*Hesperia pavne* Plötz, Stett. ent. Zeit. XLVII, 100, 1886.
*Pamphila ottoe* form *pawnee* Skinner and Williams, Trans. Am. Ent. Soc. L, 179, 1924.
*Erynnis pawnee* Draudt, Seitz's Macrolep. V, 930, pl. 180h, i, 1924.

Montana, July; Colorado, September; Omaha, Nebraska, June (Leussler); South Dakota and Sioux City, Iowa, late June and early July, late August and early September.

The under surface is usually immaculate yellow, in the female sometimes grayish and usually with pale spots. The spots on the upper surface of the primaries in the female are very pale and this sex closely resembles *attalus*. The males of *pawnee* may be distinguished from *attalus* by the more extensive pale areas of the upper surface and their lighter color.

*Pawnee* has not been common in collections but in prairie regions may fly in considerable numbers. Lindsey found it two-brooded at Sioux City; it was rare in June but more common in early September and on one day thirty-one specimens were taken in a few hours collecting. It is evidently the prevailing form of the species, but unfortunately the name *ottoe* is older. Draudt's figures may have been made from specimens of *pawnee* but they are wholly unlike the species in color and distinctness of markings and we suspect that they represent something else.

18b. race **montana** Skinner.

*Pamphila pawnee* subspecies *montana* Skinner, Ent. News XXII, 413, 1911. Colorado.

California, Colorado, Montana.

The type is much darker than normal *pawnee*, both above and below.

18c. form **ogallala** Leussler.

*Pamphila ogallala* Leussler, Ent. News XXXII, 206, 1921.

The types were taken at Omaha, Lincoln, West Point, and Valentine, Nebraska, and Sioux City, Iowa; late June and early July.

*Ogallala* is more ochreous yellow below than the other forms and the fulvous markings of the upper surface tend to form streaks along the veins.

19. **Hesperia sassacus** Harris. Pl. XIX, fig. 5; pl. XXI, fig. 17.

*Hesperia sassacus* Harris, Ins. Inj. Veg., 3rd ed., 315, 1862. Massachusetts.

*Erynnis sassacus* Scudder, Butt. E. U. S. II, p. 1641, 1889.

Holland, Butterfly Book 348, pl. XLVI, fig. 13, 1898.

Draudt, Seitz's Macrolep. V, 930, pl. 180h, 1924.

† *Erynnis sylvanoides* Holland (not Boisduval), Butterfly Book pl. XLVII, fig. 44, 1898.

New Jersey to Connecticut, westward into Iowa; May to August.

19a. race **manitoboides** Fletcher.

*Pamphila manitoboides* Fletcher, Rept. Ent. Soc. Ont. 1888, p. 85, 1889. Nepigon and Sudbury, Ontario.

*Manitoboides* was formerly called a distinct species or a form of *comma*, but it is identical with *sassacus* except in the darker color and greater contrast of the markings on the under surface. The relationship was first noted by Dr. W. T. M. Forbes.

20. **Hesperia dacotae** (Skinner). Pl. XIX, fig. 6; pl. XXI, fig. 18.

*Pamphila sassacus* subspecies *dacotae* Skinner, Ent. News XXII, 412, 1911. Volga, South Dakota.

South Dakota, Iowa; June.

This species stood for many years as a form of *sassacus*, until Skinner and Williams' study of the genitalia disclosed its validity as a species. It seems to be restricted to the prairies and is decidedly rare. Lindsey took a single female in a low marshy area during ten years of collecting at Sioux City, Iowa.

21. **Hesperia horus** Edwards.

*Hesperia horus* Edwards, Trans. Am. Ent. Soc. III, 277, 1871. Dallas, Texas.

*Pamphila horus* Barnes and McDunnough, Contributions IV (2), 80, 1918.

*Horus* is still known only from the type. It may not belong to this genus, but we are unable to add to the published information beyond this suggestion.

## Genus **Hylephila** Billberg

Logotype *Papilio phylaeus* Drury

*Hylephila* Billberg, Enum. Ins. 81, 1820.

*Euthymus* Scudder, Rept. Peabody Acad. 1871, 77 (56), 1872. Orthotype *Papilio phylaeus* Drury.

This genus closely resembles *Hesperia* in structure but differs in the very short antennae and the straighter stigma. The female, as in *Atalopedes*, does not differ much in general structure from the male. We have but one species of *Hylephila*.

1. **Hylephila phylaeus** (Drury). Pl. XXII, fig. 6.

*Papilio phylaeus* Drury, Ill. Exot. Ent. I, 25, pl. XIII, fig. 4, 5, 1770, and II, app. 1773. Antigua, St. Christopher's, Nevis, etc.

*Papilio colon* Fabricius, Syst. Ent. 531, 1775.

*Papilio phareus* Panzer, Diurn. Abbild. 59, pl. 13, fig. 4, 5, 1785.

† *Phemiades augias* Hübner (not Linnaeus), Zutr. exot. Schmett. II, 10, pl. 531, fig. 227, 228, 1821–23. Rio Janeiro.

*Pamphila bucephalus* Stephens, Ill. Brit. Ent. Haust. I, 102, pl. 10, fig. 1, 2, 1828. Great Britain.

*Hesperia phylaeus* Boisduval and LeConte, Lep. Am. Sept. pl. 78, 1833.

*Pamphila hala* Butler, Trans. Ent. Soc. Lond. 1870, 504. Venezuela.

*Hesperia ancora* Plötz, Stett. ent. Zeit. XLIV, 205, 1883.

*Hylephila phylaeus* Scudder, Butt. E. U. S. II, p. 1630, 1889.
Holland, Butterfly Book, 354, pl. XLVI, fig. 18, 19, 1898.
Draudt, Seitz's Macrolep. V, 928, pl. 180e, 1923.
Comstock, Butt. Cal. 220, pl. 61, fig. 4–6, 1927.

† *Thymelicus brettus* Holland (not Boisd. & LeC.), Butterfly Book, pl. XLVII, fig. 40, 1898.

† *Pamphila brettus* Wright (not Boisd. & LeC.), Butt. W. Coast 245, pl. XXXI, fig. 437, 1905.

† *Pamphila brettoides* Id. (not Edwards), op. cit. 245, pl. XXXI, fig. 438, b, c, 1905.

Pennsylvania to Illinois, south to the Gulf and westward through the Gulf States into California. The species flies from April to October and in some parts of its range may be found during the remaining months of the year. It is often abundant. Beyond our limits *phylaeus* occurs in Central and South America and the West Indies.

## Genus **Atalopedes** Scudder

Orthotype *Hesperia huron* Edwards

*Atalopedes* Scudder, Rept. Peabody Acad., 1871, 78 (57), 1872.

*Pansydia* Id., op. cit. 81 (60), 1872. Orthotype *Hesperia mesogramma* Poey.

Apiculus of antennae longer than in *Hesperia*, over one-half thickness of club in female. Stigma a large black blotch, so greatly developed as to cause distortion of the first cubital. This vein is so displaced that the cell is very narrow to beyond its middle. Apical angle of cell more produced than in *Hesperia*. Vein R of secondaries nearer to SC than to end of cell in male. There is less difference in structure between the sexes in this genus than in *Hesperia*. Pl. XXV, fig. 2.

1. **Atalopedes campestris** (Boisduval). Pl. XXII, fig. 1.

*Hesperia campestris* Boisduval, Ann. Soc. Ent. France (2), X, 316, 1852. California.
Oberthür, Etudes Lep. Comp. IX (1), 43, pl. CCXL, fig. 2090 (male type), 1913.

*Hesperia sylvanoides* Boisduval, op. cit. 313. Female only. California.
Oberthür, op. cit. pl. CCXL, fig. 2085 (female type), 1913.

*Hesperia huron* Edwards, Proc. Ent. Soc. Phil. II, 16, pl. I, fig. 1, 2, 1863.

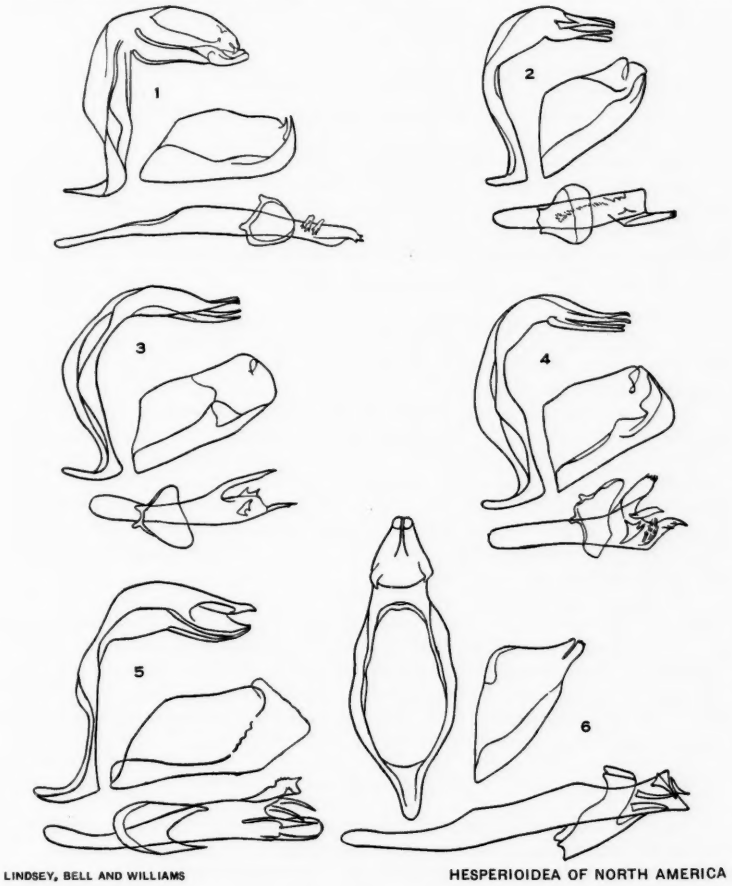




PLATE XXII. MALE GENITALIA

**Fig. 1.** *Atalopedes campestris.* **Fig. 2.** *Ochlodes morrisoni.* **Fig. 3.** *O. agricola.* **Fig. 4.** *O. sylvanoides.* **Fig. 5.** *O. snowi.* **Fig. 6.** *Hylephila phylaeus.*

*Pamphila kedema* Butler, Trans. Ent. Soc. Lond. 504, 1870.
*Hesperia amphissa* Plötz, Stett. ent. Zeit. XLIV, 221, 1883. Venezuela.
*Atalopedes huron* Scudder, Butt. E. U. S. II, p. 1661, 1889.
Holland, Butterfly Book, 352, pl. XLVI, fig. 4, 5, 1898.
Comstock, Butt. Cal. 224, pl. 62, fig. 1–3, 1927.
*Pamphila campestris* Wright, Butt. W. Coast 245, pl. XXXI, fig. 435, b, c, cc, 1905.
*Atalopedes campestris* Draudt, Seitz's Macrolep. V, 931, pl. 180k, l, 1924.

This species ranges from the Atlantic to the Pacific in the southern half of the United States, and we have definite record of its occurrence as far north as northern Iowa. It has a long flying season, our records including every month but December. Beyond our limits it extends through Central America.

## Genus **Ochlodes** Scudder

Orthotype *Hesperia nemorum* Boisduval

*Ochlodes* Scudder, Rept. Peabody Acad. 1871, 78 (57), 1872.
*Augiades* Auct., not Hübner.

Palpi upturned; third joint small, oblique, without its vestiture about one-quarter as long as second. Apiculus of antennae variable but never longer than diameter of club. Costa of primaries flattened; outer margin more strongly curved toward apex; cell about three-fifths as long as wing; vein $M_2$ curving slightly toward $M_3$; discocellulars very oblique. Secondaries rounded, slightly lobed at anal angle. Stigma straight, moderately heavy, extending from base of vein $Cu_1$ to basal two-fifths of A, broken on $Cu_2$. Mid tibiae weakly spined. Pl. XVII, fig. 7.

The species of this rather varied lot were grouped in the first edition of this paper because of the extremely short third joint of the palpi. This character is not readily seen except when the palpi are bleached or denuded, but a careful examination showed that *sylvanus*, *sylvanoides*, *agricola*, and *snowi* agree, while the other species can readily be associated with them by superficial resemblance. Other structures are variable. We add to the assemblage of the species formerly included here, *morrisoni* which was then placed in *Hesperia* (*Pamphila*).

### Key to the Species

1. Under side of secondaries with a large white dash in cell.....*morrisoni*
   No white dash on under surface of secondaries.....2
2. Spots of primaries sharply defined, often hyaline or nearly so.....3
   Spots more or less ill-defined, never hyaline.....4
3. Expanse over one inch; fulvous spots restricted.....*snowi*
   Less than one inch in expanse; fulvous of secondaries a diffuse discal patch *agricola*
4. Large; wings pale, tawny, with a little fuscous along the outer margin... *yuma*
   Smaller; wings not broadly tawny.....5
5. Under surface of secondaries with a variably distinct pale transverse band; ground color not pure pale yellowish.....*sylvanoides*, *napa*
   Under surface without a band, yellow.....*nemorum*

1. **Ochlodes morrisoni** (Edwards). Pl. XXII, fig. 2.

*Pamphila morrisoni* Edwards, Field and Forest III, 116, 1878. Southern Colorado.

*Erynnis morrisoni* Godman, Biol. Cent.-Am., Rhop. II, 478, pl. 93, fig. 9, 10, 1900.

Draudt, Seitz's Macrolep. V, 931, pl. 180k, 1924.

*Hesperia morrisoni* Comstock, Butt. Cal. 217, pl. 60, fig. 10, 1927.

Colorado, May and July; New Mexico, June; Texas, March; south into Mexico. This is a small bright species which is readily recognized by the elongation of the white mark in the cell of the secondaries below.

2. **Ochlodes sylvanoides** (Boisduval). Pl. XXII, fig. 4.

*Hesperia sylvanoides* Boisduval, Ann. Soc. Ent. France (2), X, 313, 1852. California.

Oberthür, Etudes Lep. Comp. IX (1), 43, pl. CCXL, fig. 2083, 2084, 1913.

*Hesperia pratincola* Boisduval, op. cit. 315. Female only. California.

Oberthür, op. cit. fig. 2089.

† *Hesperia agricola* Plötz (not Boisduval), Stett. ent. Zeit. XLIV, 219, 1883.

*Hesperia francisca* Id., op. cit. 220. California, Texas.

† *Pamphila nemorum* Wright (not Boisduval), Butt. West Coast 243 (in part), pl. XXI, fig. 430, c, 1905.

† *Pamphila agricola* Id., (not Boisduval), op. cit. pl. XXXI, fig. 431c, 1905.

† *Pamphila milo* Id., (not Edwards), op. cit. 244, pl. XXXI, fig. 432, 1905.

† *Pamphila pratincola* Id., (not Boisduval), op. cit. pl. XXXI, fig. 433b, 1905.

† *Pamphila ruricola* Id., (not Boisduval), op. cit. pl. XXX, fig. 416c, 1905.

*Ochlodes sylvanoides* Draudt, Seitz's Macrolep. V, 934, pl. 181f, g, 1924.

Comstock, Butt. Cal. 221, pl. 61, fig. 7–9, 1927.

† *Ochlodes agricola* Draudt (not Boisduval), op. cit. pl. 181g, 1924.

British Columbia southward through California, June to September. The species extends eastward a relatively short distance; it has been taken in Idaho, but in the more easterly parts of its range gives way to *napa*. In spite of the bewildering synonymy *sylvanoides* is common and easy to recognize.

2a. race **napa** Edwards.

*Hesperia napa* Edwards, Proc. Ent. Soc. Phil. IV, 202, pl. I, fig. 3, 4, 1865. Empire City, Colorado Terr.

Colorado, August. The race resembles *sylvanoides* in appearance but is larger and the under surface of the secondaries is less variable.

3. **Ochlodes nemorum** (Boisduval).

*Hesperia nemorum* Boisduval, Ann. Soc. Ent. France (2), X, 314, 1852. California.

Oberthür, Etudes Lep. Comp. IX (1), 43, pl. CCXL, fig. 2086, 1913. (Type.)

*Hesperia pratincola* Boisduval, op. cit. 315, California.

Oberthür, op. cit. fig. 2088. (Type).

*Pamphila nemorum* Wright, Butt. W. Coast 243, pl. XXXI, fig. 430b, 1905.

† *Pamphila agricola* Id., (not Boisduval) op. cit. pl. XXXI, fig. 431.

† *Pamphila milo* Id., (not Edwards), op. cit. pl. XXXI, 432b, c.

*Augiades sylvanoides* form *nemorum* Skinner and Williams, Trans. Am. Ent. Soc. L, 143, 1924.

*Ochlodes nemorum* Draudt, Seitz's Macrolep. V, 933, pl. 181f, male only, 1924.
Comstock, Butt. Cal. 221, pl. 61, fig. 10–12, 1927.

*Ochlodes pratincola* Draudt, op. cit. 934, pl. 181 h, 1924.

† *Ochlodes milo* Draudt (not Edwards), op. cit. pl. 181h, 1924.

*Ochlodes nemorum pratincola* Comstock, Butt. Cal. 221, pl. 61, fig. 3, 1927. (Type).

California, June.

Although the genitalia of this species resemble those of *sylvanoides* it seems to be a distinct species, smaller in size and with the under surface uniform in color.

4. **Ochlodes agricola** (Boisduval). Pl. XXII, fig. 3.

*Hesperia agricola* Boisduval, Ann. Soc. Ent. France (2), X 314, 1852. California.
Oberthür, Etudes Lep. Comp. IX (1), 43, pl. CCXL, fig. 2087, 1913. (Type).

*Hesperia yreka* Edwards, Proc. Ent. Soc. Phil. VI, 207, 1866. San Francisco.

*Pamphila verus* Id., Trans. Am. Ent. Soc. IX, 4, 1881. Havilah, California.

*Pamphila milo* Id., Can. Ent. XV, 34, 1883. Mt. Hood, Oregon.

† *Pamphila nemorum* Skinner (not Boisduval), Ent. News XI, 414, pl. II, fig. 21, 1900.

*Pamphila agricola* Wright, Butt. W. Coast 243, pl. XXXI, fig. 431b, 1905.

† *Pamphila pratincola* Wright (not Boisduval), op. cit. pl. XXXI, fig. 433c.

† *Ochlodes nemorum* Draudt (not Boisduval), Seitz's Macrolep. V, 933, pl. 181f, female only, 1924.

*Ochlodes agricola* Comstock, Butt. Cal. 222, pl. 61, fig. 14, 15, 19, 1927.

California, May to August.

The trace of hyaline spots on the primaries makes this one of the easiest species to recognize in this genus.

5. **Ochlodes snowi** (Edwards). Pl. XXII, fig. 5.

*Pamphila snowi* Edwards, Can. Ent. IX, 29, 1877. Ute Pass, Colorado.

*Erynnis snowi* Holland, Butterfly Book 350, pl. XLVII, fig. 29, 30, 1898.

*Ochlodes snowi* Godman, Biol. Cent.-Am., Rhop. II, 483, pl. 93, fig. 19–23, 1900.
Draudt, Seitz's Macrolep. V, 934, pl. 181g, 1924.

Arizona, New Mexico, and Colorado, June to August.

6. **Ochlodes yuma** (Edwards).

*Hesperia yuma* Edwards, Trans. Am. Ent. Soc. IV, 346, 1873. Arizona.

*Pamphila scudderi* Skinner, Ent. News X, 111, 1899. White River, Colorado.
Id., op. cit. XI, pl. II, fig. 9, 10, 1900.

*Ochlodes yuma* Comstock, Butt. Cal. 222, pl. 61, fig. 16-18, 1927.

California, June; Utah and Arizona, July.

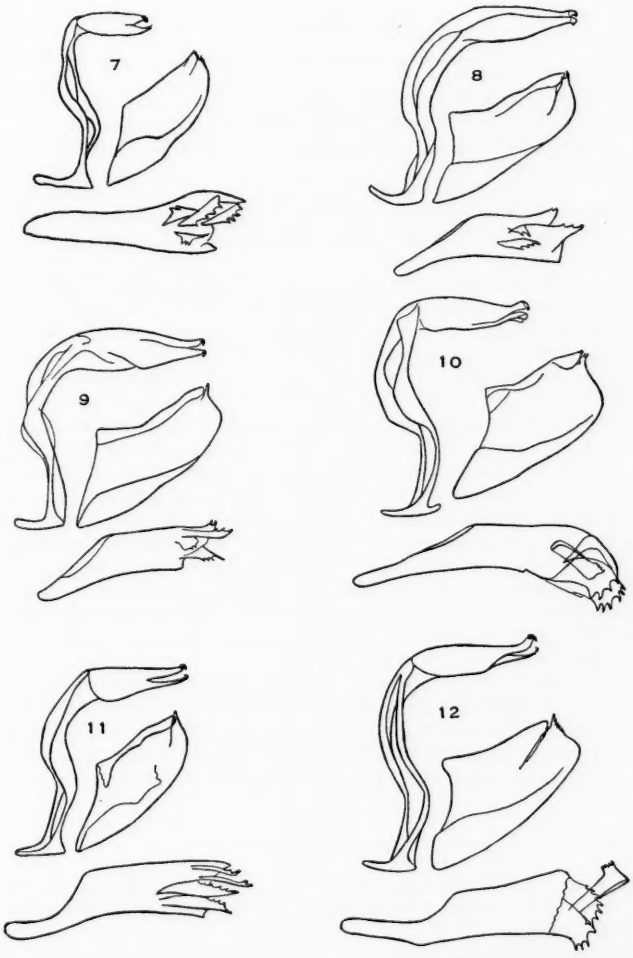




PLATE XXIII. MALE GENITALIA OF *Talides*

Fig. 7. *brettus*. Fig. 8. *sabuleti*. Fig. 9. *draco*. Fig. 10. *sonora*. Fig. 11. *themistocles*. Fig. 12. *manataaqua*.

## Genus **Talides** Hübner

Logotype *Talides athenion* Hübner

*Talides* Hübner, Verz. bek. Schmett. 106, 1820.
Lindsey, Denison U. Bull., Jn. Sci. Lab. XXI, 93, 1925.
*Polites* Scudder, Rept. Peabody Acad. 1871, 78 (57), 1872. Orthotype *Hesperia peckius* Kirby.
*Hedone* Id., op. cit. 79 (58). Orthotype *Hesperia brettus* Boisduval and LeConte.
*Limochores* Id., op. cit. 80 (59). Orthotype *Hesperia manataaqua* Scudder.
*Pyrrhosidia* Id., Mem. Bost. Soc. Nat. Hist. II, 346, 1874. Orthotype *Hesperia mystic* Edwards.

Palpi upturned; third joint about one-half as long as second, slender, distinct. Antennae shorter than in *Ochlodes*, varying from two-fifths as long as primaries in some females to one-half in some males; club rather large, usually longer in the female and occasionally almost as long as the shaft; apiculus abruptly constricted and reflexed, shorter than thickness of club, though variable in length. Wings variable; costa of primaries usually straight except at base and apex but sometimes slightly emarginate or convex; outer margin very slightly sinuate to evenly rounded, more rounded in the female. Primaries often apically produced in the male, less so in the female. Secondaries broadly rounded, very slightly lobed at the anal angle. Cell of primaries about three-fifths as long as wing; vein $M_2$ much nearer to $M_3$ than to $M_1$ at base; $Cu_2$ always arising nearer to $Cu_1$ than to base of wing but variable. Discocellulars moderately oblique. Mid tibiae with prominent spines. Stigma of male in its most complex form made up of an outer oblique black line, a black dash from end of cell to vein $Cu_2$, and a black spot above the basal third of A, the enclosed space filled with gray scales and the entire stigma followed by a patch of raised gray scales. In many of the species the stigma is much simpler. Pl. XXV, fig. 4.

The association of North American species which we follow was first adopted by Barnes and McDunnough (Contributions III, 130, 1916) with the exception of *verna*; this species was added to the genus in the first edition of this paper.

It is unfortunate that the familiar name, *Polites*, must be replaced by a name from the tropical fauna, but we find no reason whatever for the retention of two genera.

### Key to the Species

1. Under surface of secondaries immaculate or with a transverse band of pale spots, never sharply bent opposite cell nor with spot at this point much the largest.....2
   Secondaries otherwise below.....7
2. Upper surface of secondaries immaculate or with a few very vague spots..3
   Upper surface always with a transverse row of spots, more or less suffused; usually with a spot in the cell.....5
3. Small Florida species. Stigma of male very small, female usually with a few powdery whitish spots on under surface of secondaries.....*baracoa*
   Usually moderate to large. Stigma large. Spots, when present, not superficial and powdery, and usually showing slightly on upper surface.....4

4. Smaller; male stigma with several velvety black areas; female with spots of primaries tinged with fulvous, costa and cell often partly fulvous ..... *themistocles*

Larger; stigma of male continuous or broken only on vein $Cu_2$; maculation of female pale, whitish, rarely with a little pale fulvous in cell..*manataaqua*

5. Under surface of secondaries powdered with yellowish to green scales; macular band slender..... *sonora*

Color below straw yellow to brown; band broader.....6

6. Male stigma slender, broken on vein $Cu_2$; female usually with much yellow-fulvous above; in western specimens pale below and well marked above ..... *mystic*

Male stigma with three black areas; female with hazy transverse rows of spots on all wings and some fulvous in cell, not extensively marked. Under surface dark, powdered with yellow. A western species..... *mardon*

7. Pale areas on under surface extending in pale lines along the veins..... *sabuleti*

Pale areas at most angulate on veins.....8

8. All spots of band large but not equal, that between $M_3$ and $M_1$ largest; color yellow..... *peckius*

Spots small except the one between $M_1$ and $M_3$; their color white or whitish..... *draco*

Pale area covering entire wing except a few dark patches, not divided into separate spots and rarely defined as a band; secondaries sometimes entirely yellow below. Female with yellow areas heavily powdered with dark scales, secondaries immaculate above.....9

9. Male stigma very broad..... *vibex*

Male stigma moderate..... *brettus*

1. **Talides verna** (Edwards). Pl. XXIV, fig. 16.

*Pamphila verna* Edwards, Proc. Acad. Nat. Sci. Phil. 57, 1862. Illinois.
*Pamphila pottawattomie* Worthington, Can. Ent. XII, 50, 1880. Cook Co., Ill., and Lake Co., Ind.
*Hesperia vetulina* Plötz, Stett. ent. Zeit. XLIV, 58, 1883.
*Euphyes verna* Scudder, Butt. E. U. S. II, p. 1742, 1889.
Holland, Butterfly Book 360, pl. XLVI, fig. 32, 1898.
Draudt, Seitz's Macrolep. V, 935, pl. 182a, 1924.

Eastern United States south to Alabama and west to Colorado; May to September.

2. **Talides manataaqua** (Harris). Pl. XXIII, fig. 12.

† *Hesperia cernes* Harris (not Boisduval), Ins. Inj. Veg. 3rd ed., 316, 1862.
*Hesperia manataaqua* Scudder, Proc. Ess. Inst. III, 175, 1863. (New name).
*Limochores manataaqua* Id., Butt. E. U. S. II, p. 1720, 1889.
Holland, Butterfly Book 357, pl. XLVI, fig. 30, 1898.
Draudt, Seitz's Macrolep. V, 934, pl. 181i, 1924.

Northeastern United States to Alabama, west into Nebraska and South Dakota; May to September.

Holland's figure looks like a dark female of *themistocles*; the difference is difficult to explain but *manataaqua* is generally larger and darker than *themistocles*.

2a. race **rhena** Edwards.

*Pamphila rhena* Edwards, Field and Forest III, 115, 1878. Southern Colorado.

*Pamphila alcina* Skinner, Ent. News IV, 212, 1893. Colorado. Id., op. cit. XI, 414, pl. II, fig. 25, 1900. (Type.)

This race is distinguished from the typical form by its paler color, more extensive markings, and by the larger amount of pale tawny which marks the upper surface. It flies from June until August in Colorado.

3. **Talides themistocles** (Latreille). Pl. XXIII, fig. 11.

† *Papilio taumas* Fabricius (not Hufnagel), Mant. Ins. II, 84, 1787.

† *Hesperia thaumas* Id., (not Hufn.), Ent. Syst. III (I), 327, 1793.

‡ *Hesperia phocion* Id., Ent. Syst., Supp. 431, 1798. Homonym. Amer. Merid.

*Hesperia themistocles* Latreille, Enc. Meth. IX, 723, 1823. New name.

***Hesperia cernes*** Boisduval and LeConte, Lep. Am. Sept. pl. 76, fig. 1, 2, 1833. Georgia.

*Hesperia ahaton* Harris, Ins. Inj. Veg. 3rd ed., 317, fig. 140, 1862. Massachusetts.

† *Pamphila origines* Morrison (not Fabricius), Syn. Lep. N. A. 117, 1862.

*Limochores taumas* Scudder, Butt. E. U. S. II, p. 1725, 1889.
Holland, Butterfly Book 357, pl. XLVII, fig. 20, 1898.

*Limochores cernes* Draudt, Seitz's Macrolep. V, 935, pl. 181k, 1924.

*Polites themistocles* Barnes and Benjamin, Ent. News XXXVII, 269, 1926.

United States and Canada, February to October; it probably flies throughout the year in some parts of its range.

This is one of the commonest of North American skippers, but since the names *taumas* and *cernes* have struggled indecisively for adoption we need not fear the results of supplanting both by a different name.

4. **Talides baracoa** (Lucas). Pl. XXIV, fig. 15.

*Hesperia baracoa* Lucas, Sagra's Hist. Cuba VII, 650, 1857. Cuba.

*Pamphila amadis* Herrich-Schaeffer, Corr.-Blatt Regensb. XVII, 142, 1863. Cuba.

*Pamphila myus* French, Can. Ent. XVII, 33, 1885. Florida.

*Polites baracoa* Draudt, Seitz's Macrolep. V, 932, pl. 181d, 1924.

Florida, January to April, July, September; West Indies.

This species is smaller and darker than *themistocles* and the males are easily distinguished by the small stigma. Some females of *themistocles* run very close but in most specimens of *baracoa* the powdery spots mentioned in the key are present. Draudt's figures are poor.

5. **Talides mardon** (Edwards). Pl. XXIV, fig. 14.

*Pamphila mardon* Edwards, Papilio I, 47, 1881. Mt. Hood, Oregon.

*Polites mardon* Holland, Butterfly Book 354, pl. XLVII, fig. 26, 1898.
Comstock, Butt. Cal. 222, pl. 61, fig. 23, 1927.

*Thymelicus mardon* Draudt, Seitz's Macrolep. V, 932, pl. 181b, 1924.

Washington and Oregon, May.

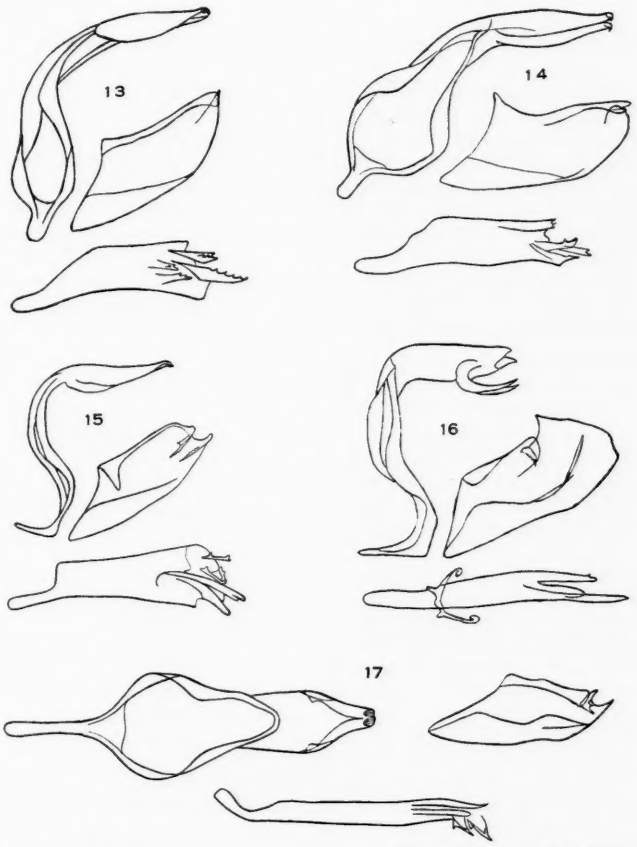




PLATE XXIV. MALE GENITALIA

Fig. 13. *Talides peckius*. Fig. 14. *T. mardon*. Fig. 15. *T. baracoa*. Fig. 16. *T. verna*. Fig. 17. *Catia otho*.

6 **Talides peckius** (Kirby). Pl. XXIV, fig. 13.

*Hesperia peckius* Kirby, Faun. Bor. Am. IV, 300, pl. 4, fig. 2, 3, 1837. North America.

*Hesperia wamsutta* Harris, Ins. Inj. Veg. 3rd ed., 318, fig. 141, 1862. Massachusetts.

*Pamphila enys* Butler, Ent. Mo. Mag. VII, 93, 1870.

*Polites peckius* Scudder, Butt. E. U. S. II, p. 1683, 1889.

Holland, Butterfly Book 353, pl. XLVII, fig. 24, 25, 1898.

*Polites coras* Draudt, Seitz's Macrolep. V, 932, pl. 181c, d, 1924.

Atlantic coast to Texas and Arizona; Southern Canada; May to September.

In the large quantities of South American material which have passed through our hands we have never found this species, therefore we regard it as doubtful that Cramer's *coras* should supplant *peckius*. Cramer's type locality, Surinam, may be an error but since his figure is only approximately like our species we feel that the evidence is insufficient. *Aesculapius* Fab. is also a doubtful synonym; if it can be proved applicable to this species it will supplant *peckius*

7. **Talides sabuleti** (Boisduval). Pl. XXIII, fig. 8.

*Hesperia sabuleti* Boisduval, Ann. Soc. Ent. France (2), X, 316, 1852. California.

Oberthür, Etudes Lep. Comp. IX (1), pl. CCXL, fig. 2091, 2092, 1913.

*Hesperia genoa* Plötz, Stett. ent. Zeit. XLIV, 207, 1883. Nevada.

*Hesperia chusca* Edwards, Trans. Am. Ent. Soc. IV, 346, 1873. Arizona.

*Pamphila sabuleti* Wright, Butt. W. Coast 246, pl. XXXI, fig. 440, 1905.

*Polites sabuleti* Draudt, Seitz's Macrolep. V, 932, pl. 181d, 1924.

Comstock, Butt. Cal. 223, pl. 61, fig. 24-26, 1927.

*Polites sabuleti* var *comstocki* Gunder, Ent. News XXXVI, 7, fig. 5, 6, 1925. Imperial Valley, Cal.

Oregon to Arizona, eastward into Nevada; April to September.

The pale marks of the lower surface are yellowish on a background of darker yellowish color. *Comstocki* is merely a very pale form; we do not regard it as worthy of a separate name. *Chusca* is apparently the same as *comstocki*.

7a. race **tecumseh** Grinnell.

*Pamphila sabuleti* var. *tecumseh* Grinnell. Ent. News XIV, 11, 1903. Little Crabtree Meadow, near Mt. Whitney, California.

*Pamphila chispa* Wright, Butt. W. Coast 247, pl. XXXI, fig. 441, b, c, 1905. Sierra Nevada.

*Polites chispa* Draudt, Seitz's Macrolep. V, 932, pl. 181d, 1924.

*Polites sabuleti tecumseh* Comstock, Butt. Cal. 223, pl. 61, fig. 27, 28, 30, 31, 1927.

California, June to August.

*Tecumseh* is smaller than typical *sabuleti* and has the fulvous areas of the upper surface more restricted. The under surface has a greenish-gray shade and the pale spots are smaller.

8. **Talides draco** (Edwards). Pl. XXIII, fig. 9.

*Pamphila draco* Edwards, Trans. Am. Ent. Soc. III, 274, 1871. Colorado.

Skinner, Ent. News, XI, pl. II, fig. 23, 1900.

*Thymelicus draco* Draudt, Seitz's Macrolep. V, 932, pl. 181c, 1924.
California, Utah, and Colorado, June to August.

9. **Talides sonora** (Scudder). Pl. XXIII, fig. 10.
*Ochlodes sonora* Scudder, Rept. Peabody Acad. 1871, 78 (57), 1872. Sierra Nevada, California.
*Pamphila siris* Edwards, Papilio I, 47, 1881. Mt. Hood, Oregon.
† *Pamphila sylvanoides* Wright (not Boisduval), Butt. W. Coast 242, pl. XXXI, fig. 425, b, c, 1905.
† *Pamphila columbia* Id., (not Scudder), op. cit. pl. XXXI, fig. 425, 426.
*Polites sonora* Comstock, Butt. Cal. 222, pl. 61, fig. 20–22, 1927.
California to Washington, east into Colorado and Wyoming; May to August.
The under surface of the secondaries is distinctly more yellow than that of *utahensis*. *Siris* is brownish below; its retention as a named form is a matter of opinion.

9a. race **utahensis** Skinner.
*Pamphila sylvanoides* subsp. *utahensis* Skinner, Ent. News XXII, 413, 1911. Park City, Utah, etc.
Idaho, Wyoming, Colorado, and Utah; July and August.
The under surface of the secondaries is distinctly greenish in this race.

10. **Talides mystic** (Scudder).
*Hesperia mystic* Scudder, Proc. Ess. Inst. III, 172, 1863. White Mountains.
*Thymelicus mystic* Holland, Butterfly Book 351, pl. XLVI, fig. 22, 23, 1898. Draudt, Seitz's Macrolep. V, 931, pl. 181b, 1924.
New Jersey, north into Canada and west to beyond the Missouri River; May to September.
Most specimens from the western limits of the range are of the race *dacotah*, but typical mystic occurs in western Iowa. In this form the under surface of the secondaries is fairly dark with a contrasting pale band. The male genitalia resemble those of *sonora*.

10a. race **dacotah** Edwards.
*Hesperia dacotah* Edwards, Trans. Am. Ent. Soc. III, 277, 1871. Colorado.
*Pamphila mystic* subsp. *pallida* Skinner, Ent. News XXII, 412, 1911. Volga, South Dakota.
Colorado, June; eastward into South Dakota and Iowa, May to July.
The under surface of the secondaries is yellow, scarcely darker than the pale transverse band in extreme specimens.

10 b. ab. **weetamoo** Scudder.
*Thymelicus mystic* var. *weetamoo* Scudder, Butt. E. U. S. II, p. 1707, 1889.
A dark brown melanic aberration occurring in the female sex. Ordinary spots much reduced, separate.

10c. ab. **nubs** Scudder.
*Thymelicus mystic* var. *nubs* Scudder, Butt. E. U. S. II, 1707, 1889.
Also a female aberration; dark areas suffused with tawny scales.

11. **Talides brettus** (Boisduval and LeConte). Pl. XXIII, fig. 7.

*Hesperia brettus* Boisduval and LeConte, Lep. Am. Sept. pl. 75, fig. 3–5, 1833. Georgia.

*Hesperia wingina* Scudder, Proc. Ess. Inst. III, 173, 1863. Southern New England.

*Hesperia morganta* Plötz, Stett. ent. Zeit. XLIV, 203, 1883. South America.

*Hesperia unna* Id., op. cit. 204. Philadelphia.

*Thymelicus brettus* Scudder, Butt. E. U. S. II, p. 1701, 1889.
Holland, Butterfly Book 351, pl. XLVII, fig. 41, 1898.
Draudt, Seitz's Macrolep. V, 931, pl. 181a, 1924.

*Thymelicus margarita* Draudt (Plötz?), Seitz's Macrolep. V, 931, 1924.

*Polites brettus* Lindsey, Denison U. Bull., Jn. Sci. Lab. XXI, 93, 1925.

Florida, north to Virginia, west to Texas; February to April, July to October.

11a. race **brettoides** Edwards.

*Pamphila brettoides* Edwards, Papilio III, 71, 1883. Graham Mts., Arizona.

*Hesperia clara* Plötz, Stett. ent. Zeit. XLIV, 203, 1883. California.

*Thymelicus brettus* form *brettoides* Draudt, Seitz's Macrolep. V, 931, pl. 180k, 1924.

Texas and Arizona.

*Brettoides* has a very narrow dark outer margin in the male, with no more than a trace of the dark patch at the end of the stigma; the under surface is likewise broadly tawny yellow. The female has some fulvous overscaling on the costal margin of the primaries and on the disk of the secondaries. On the under surface of the secondaries the dark spots are obsolescent, only slightly darker than the ground color.

12. **Talides vibex** (Geyer).

*Thymelicus vibex* Geyer, Zutr. exot. Schmett. 22, fig. 685, 686, 1832. West Indies.
Draudt, Seitz's Macrolep. V, 931, pl. 181a, 1924.

*Hedone praeceps* Scudder, Rept. Peabody Acad. 1871, 79 (58), 1872. Tehuantepec.

*Pamphila golema* Möschler, Verh. z.-b. Ges. Wien. XXVIII, 218, 1878. Colombia.

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PLATE XXV

Fig. 1. *Prenes ocola*: a. club of antenna; b. neuration. c. *Calpodes ethlius*, club of antenna. Fig. 2. *Atalopedes campestris*: a. club of antenna, b. palpus, c. neuration. Fig. 3. *Amblyscirtes vialis*: a. club of antenna, b. palpus, c. neuration. Fig. 4. *Talides*. Antennal clubs: a. *verna*, b. *manataaqua*, male, c. same, female. Palpi: d. *verna*, e, same, denuded, dorsal aspect, f. *manataaqua*, g. *brettus*, denuded. h. Neuration of *peckius*, male. Details of neuration, cubital stem of primary: i. *peckius*, male, j. *cernes*, male, k. *mystic*, female, l. *sonora*, male, m. *manataaqua*, female. n. Middle leg of *verna*. Fig. 5. Male genitalia of *Thorybes diversus*. Fig. 6. Male genitalia of *Erynnis meridianus*. Fig. 7. Male genitalia of *Hesperia dodgei*. Fig. 8. Male genitalia of *Amblyscirtes texanae*.

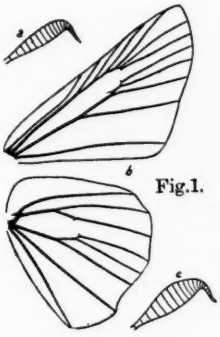


Fig.1.

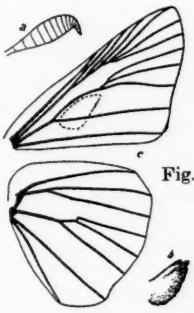


Fig. 2.

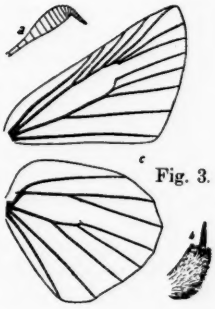


Fig. 3.

Fig. 7.

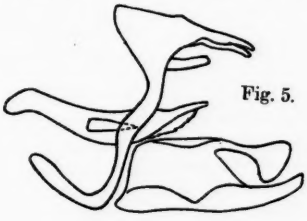


Fig. 5.

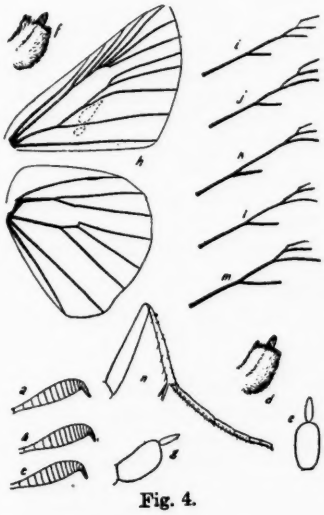
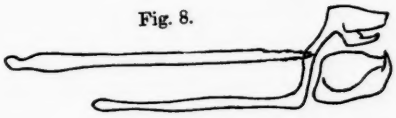


Fig. 4.

Fig. 8.



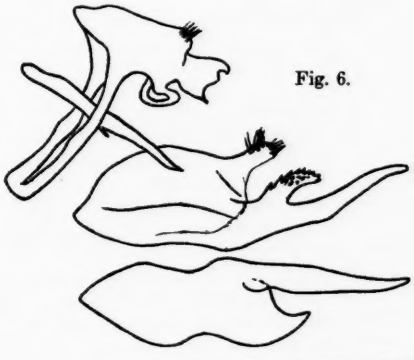


Fig. 6.

*Hesperia zenckei* Plötz, Stett. ent. Zeit. XLIV, 196, 1883. Mexico.
*Pamphila stigma* Skinner, Can. Ent. XXVIII, 188, 1896. Southern New Mexico and Southwestern Texas.
Id., Ent. News XI, pl. II, fig. 15, 16, 1900. (15 is cotype.)
*Hesperia combinata* Godman, Ann. & Mag. Nat. Hist. XX, 144, 1907.
*Polites vibex* Skinner and Williams, Trans. Am. Ent. Soc. L, 147, 1924.
Lindsey, Denison U. Bull., Jn. Sci. Lab. XXI, 93, 1925.
Texas and New Mexico, April, May and November.

Dyar, Godman, and Skinner and Williams have stated in print the conviction that *stigma* and *vibex* are the same species. In following the same course we wish to call attention to the existence of three species, *vibex*, *brettus*, and *bittiae*, with identical genitalia, as pointed out by Lindsey in 1925. In such a group one must always be alert to resurrect synonyms in case of need.

## Genus **Catia** Godman

Orthotype *Hesperia drury* Latreille

*Catia* Godman, Biol. Cent.-Am., Rhop. II, 481, 1900.

*Catia* is structurally similar to *Talides* but differs in the long slender apiculus of the antennae, which always exceeds the diameter of the club, and in the form of the male stigma. The stigma is composed of a velvety black patch below the end of the cell and a similar patch above the inner third of the anal vein, with large silky gray scales between. In the bleached wing it appears as two similar oval spots, one on each side of vein $Cu_2$, near its base. Pl. XVII, fig. 6.

In describing *Catia* Godman says of the peculiar structure of the stigma that it "is so remarkable that we think it of sufficient importance to put the species possessing this character into a separate genus." *Otho* is closely related to the species now included in *Talides* and was formerly associated with some of them in *Thymelicus*, but the form of the apiculus separates them and no fundamental or superficial similarity can be traced in the stigmata.

1. **Catia otho** (Abbot and Smith). Pl. XXIV, fig. 17.
*Papilio otho* Abbot and Smith, Lep. Ins. Ga. I, 31, pl. 16, 1797. Georgia.
*Hesperia drury* Latreille, Enc. Meth. IX, 767, 1823.
*Thymelicus pustula* Geyer, Zutr. exot. Schmett. IV, fig. 625, 626, 1832. Georgia.
*Hesperia aetna* Boisduval, Ind. Meth. 35, 1840.
*Catia druryi* Godman, Biol. Cent.-Am., Rhop. II, 482, pl. XCIII, fig. 18 (male gen.), 1900.
Draudt, Seitz's Macrolep. V, 933, pl. 181e, 1924.
*Pamphila lacordairii* Godman, op. cit. 483. Nom. nud., Staudinger ms.
*Pamphila winslowi* Weeks, Psyche XIII, 69, 1906. Suapure, Venezuela.
Florida to Texas, February to September. Central America.

The southern specimens which we refer to *otho* tend to a reddish shade on the under surface; on the upper surface of the secondaries there are some discal spots, while the primaries have fulvous on the basal half of the costa, a complete series of subapical spots, and sometimes other fulvous marks in addition to those found in *egeremet*.

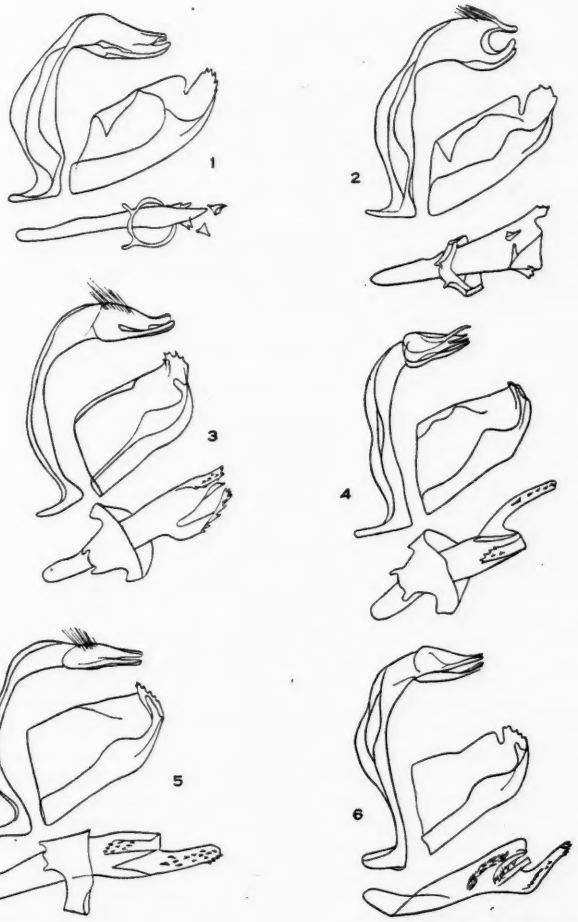





PLATE XXVI. MALE GENITALIA OF *Poanes*

Fig. 1. *viator*. Fig. 2. *massasoit*. Fig. 3. *hobomok*. Fig. 4. *zabulon*. Fig. 5. *taxiles*. Fig. 6. *melane*.

1a. race **egeremet** Scudder.

*Hesperia egeremet* Scudder, Proc. Ess. Inst. III, 174, 1863. Massachusetts.
† *Hedone aetna* Scudder (not Boisduval), Rept. Peabody Acad. 1871, 79 (58), 1872.
*Pamphila ursa* Worthington, Can. Ent. XII, 49, 1880. Indiana.
*Hesperia cinna* Plötz, Stett. ent. Zeit. XLIV, 58, 1882. "Union."
*Thymelicus aetna* Scudder, Butt. E. U. S. II, p. 1696, 1889.
Holland, Butterfly Book 351, pl. XLVI, fig. 28, 29, 1898.

United States and southern Canada, west to the Rocky Mountains. June to August. Texas, October.

Under surface pale fuscous, sometimes tinged with brown; secondaries rarely with a trace of discal marks above and pale spots of primaries limited to three or less beyond the stigma and one or two subapical points. The females of *otho* and *egeremet* have the same pale marks as the males.

## Genus **Poanes** Scudder

Orthotype *Hesperia massasoit* Scudder

*Poanes* Scudder, Rept. Peabody Acad. 1871, 76 (55), 1872.
*Phycanassa* Id., op. cit. 77 (56). Orthotype *Hesperia viator* Edwards.
*Choranthus* Id., op. cit. 79 (58). Orthotype *Hesperia radians* Lucas.
*Paratrytone* Dyar, Jn. N. Y. Ent. Soc. XIII, 136, 1905. Orthotype *Pamphila howardi* Skinner.

Palpi oblique; second joint shaggy, third small, not long though sometimes rendered prominent by its vestiture. Antennae about one-half as long as primaries; club large, apiculus varying from rather slender and slightly shorter than thickness of club to long, thick, tapering, and not well reflexed. Primaries trigonate; costa slightly convex; outer margin slightly to prominently rounded; apex rather prominent. Secondaries broadly rounded, slightly lobed at anal angle. Cell of primaries well over one-half as long as wing; vein $M_2$ moderately curved in basal half, arising nearer to $M_3$ than to $M_1$; $Cu_2$ nearer to $Cu_1$ than to base of wing. Cell of secondaries less than one-half as long as wing. Mid tibiae with a few long spines. Pl. XVII, fig. 2.

*Hobomok*, *zabulon*, *taxiles*, and *melane* were first placed in *Poanes* by Barnes and McDunnough (Contributions III, 132, 1916). Although *melane* is rather anomalous, it apparently belongs with the other species, whose relation to *massasoit* through *hobomok* is obvious. Owing to the great range of variation thus introduced into the genus in the structure of the antennae, palpi, and wings, *viator* was also added in the first edition of this work, together with the species formerly placed in *Paratrytone*. These last possess the stigma in the male but it is variable. In *howardi*, *aaroni*, and *radians* it is slender, sometimes scarcely visible but often well marked, and in *yehl* it is heavier but very variable. In one of the types of *yehl* it is slender while in the other it is as heavy as in some specimens of *conspicua*. Including all of these species, *Poanes* becomes a complex genus embracing several divergent phylogenetic lines.

KEY TO THE SPECIES

1. Under surface of secondaries uniform deep ochre yellow.....*haitensis*
   Under surface of secondaries with bright yellow marks.....2
   No clear yellow on under surface.....4
2. Yellow a broad transverse band crossed by a broad ray through the cell.....3
   Yellow much more extensive.....*zabulon*
3. Wings broadly yellow-fulvous with narrow fuscous margins; yellow of under surface rather dull.....*taxiles*
   Wings less broadly fulvous; more or less fuscous within outer marginal band; yellow of under surface bright.....*hobomok*
   Wings dark, with or without small pale spots.....*massasoit*
4. Upper surface of secondaries with pale markings indefinite or faint; sometimes immaculate.....5
   This surface with a bright yellow-fulvous patch.....8
5. Pale spot in cell of primaries at least faintly indicated.....*pocahontas*
   No trace of this spot.....6
6. Wings immaculate above.....*massasoit* form *suffusa*
   Wings with pale spots.....7
7. Under surface with some bluish irroration.....female *zabulon*
   Without bluish irroration.....*melane*
8. Primaries with definite spots or a dark stigma.....9
   Spots diffuse, extended, or discal area broadly yellow-fulvous; male stigma slender, pale.....10
9. Male with stigma; female with three small round pale spots on undersurface of secondaries.....*yehl*
   Male without stigma; female without such spots.....*viator*
10. Under surface of secondaries with a vague pale dash through the cell...*aaroni*
    Under surface partly greenish fuscous with contrasting pale veins.....*radians*

1. **Poanes viator** (Edwards). Pl. XXVI, fig. 1.

   *Hesperia viator* Edwards, Proc. Ent. Soc. Phil. IV, 202, pl. I, fig. 5, 1865. N. Illinois and New Orleans.

   *Phycanassa viator* Scudder, Butt. E. U. S. II, p. 1604, 1889.
   Holland, Butterfly Book, 362, pl. XLVI, fig. 15, 1898.
   Draudt, Seitz's Macrolep. V, 936, pl. 182b, 1924.

   Southeastern Canada to Alabama, westward into Nebraska; June to August.

2. **Poanes massasoit** (Scudder). Pl. XXVI, fig. 2.

   *Hesperia massasoit* Scudder, Proc. Ess. Inst. III, 171, 1863. Carver, Massachusetts; Connecticut.

   *Poanes massasoit* Id., Butt. E. U. S. II, p. 1597, 1889.
   Holland, Butterfly Book 361, pl. XLVI, fig. 21, 22, 1898.
   Draudt, Seitz's Macrolep. V, 936, pl. 182a, 1924.

New Jersey to Rhode Island, north into New England and west into Iowa. Skinner (Catalogue p. 80) recorded it westward and southward to Texas and Colorado.

The male is either immaculate blackish brown above or with a few small yellow-fulvous spots, while the female frequently has the spots of large size and pale color.

2a. form **suffusa** Laurent.

*Pamphila massasoit* var. *suffusa* Laurent, Ent. News III, 15, 1892. Philadelphia.

Skinner, Ent. News XI, pl. II, fig. 22, 1900.

*Poanes massasoit* form *suffusa* Draudt, Seitz's Macrolep. V, 936, 1924.

3. **Poanes hobomok** (Harris). Pl. XXVI, fig. 3.

*Hesperia hobomok* Harris, Ins. Inj. Veg. 3rd ed., 313, fig. 137, 1862. Massachusetts.

† *Atrytone zabulon* Scudder (not Boisd. & LeC.), Butt. E. U. S. II, p. 1617, 1889.

Holland, Butterfly Book 364, pl. XLVII, fig. 37, 38, 1898.

*Pamphila hobomok* Jones, Ent. News VIII, 121, pl. VII, 1897.

Skinner, Ent. News XI, 413, pl. II, fig. 1, 2, 1900.

*Poanes hobomok* ab. *pallida* Watson, Jn. N. Y. Ent. Soc. XXIX, 172, 1921. Near Dunwoodie, New York.

*Atrytone hobomok* Draudt, Seitz's Macrolep. V, 937, pl. 182, c, d, 1924.

West Virginia north into Canada and west into Nebraska; May and June.

3a. female form **pocahontas** Scudder.

*Hesperia pocahontas* Scudder, Proc. Ess. Inst. III, 171, 1863. Massachusetts and Connecticut.

*Hesperia quadaquina* Id., Proc. Bost. Soc. Nat. Hist. XI, 381, 1868. Massachusetts.

*Atrytone zabulon* female form *pocahontas* Id., Butt. E. U. S. II, p. 1617, 1889.

*Pamphila hobomok (pocahontas)* Skinner, Ent. News XI, pl. II, fig. 3, 4, 1900.

*Poanes hobomok* form female *pocahontas* ab. *friedlei* Watson, Jn. N. Y. Ent. Soc. XXVIII, 232, 1920.

*Poanes hobomok* form *pocahontas* Skinner and Williams, Trans. Am. Ent. Soc. L, 58, 1924.

*Atrytone hobomok* form *pocahontas* Draudt, Seitz's Macrolep. V, 937, pl. 182d, 1924.

Northeastern United States, Quebec; May and June. Although normal *hobomok* extends much farther west this form seems to be limited to the eastern portion of the range.

*Pocahontas* differs from the normal female in the pale shade and greater restriction of the spots on the upper surface and in the brown powdering of the secondaries below. There are so many gradations between the extremely dark specimens of *pocahontas* and the normal form that the value of additional names seems negligible.

3b. ab. **alfaratta** Holland.

*Poanes hobomok* var. female *alfaratta* Holland, Ann. Carnegie Mus. XIX, 159, 1930. Kansas.

We are not familiar with this recently named form and can place it only tentatively from the description.

4. **Poanes zabulon** (Boisduval and LeConte). Pl. XXVI, fig. 4.

*Hesperia zabulon* Boisduval and LeConte, Lep. Am. Sept. pl. 76, fig. 6, 7, 1833. Georgia.

*Hesperia erratica* Plötz, Stett. ent. Zeit. XLIV, 24, 1883. Guatemala.
*Papilio ogeechensis* Scudder (Abbot ms.), Butt. E. U. S. II, p. 1617, 1889.
† *Atrytone zabulon* var. *pocahontas* Holland (not Scudder), Butterfly Book 364, pl. XLVII, fig. 39, 1898.
*Atrytone zabulon* Draudt, Seitz's Macrolep. V, 937, pl. 182c, 1924.

Massachusetts to North Carolina, west to Iowa and Missouri; May to August.

The under surface of the secondaries in the male is bright yellow with a few brown marks. In the female the brown areas are more extensive and the entire wing is so heavily powdered with rusty scales that it is difficult to trace the pale areas at all. On the upper surface the female differs from *pocahontas* in the much brighter appearance and sharper definition of the spots.

5. **Poanes taxiles** (Edwards). Pl. XXVI, fig. 5.
*Pamphila taxiles* Edwards, Trans. Am. Ent. Soc. IX, 5, 1881. Arizona, South Colorado, Nevada, California.
*Atrytone taxiles* Holland, Butterfly Book 365, pl. XLVII, fig. 31, 32, 1898.
Draudt, Seitz's Macrolep. V, 939, pl. 182g, 1924.
*Poanes taxiles* Comstock, Butt. Cal. 225, pl. 62, fig. 5, 10, 11, 1927.

Nevada to western Nebraska, south into New Mexico and Arizona; June to July. So far as we know the type locality California is an error.

6. **Poanes melane** (Edwards). Pl. XXVI, fig. 6.
*Hesperia melane* Edwards, Trans. Am. Ent. Soc. II, 312, 1869. California.
*Cobalus vitellina* Herrich-Schaeffer, Corr.-Blatt Regensb. XXIII, 199, 1869. Tropical America.
*Atrytone melane* Godman, Biol. Cent.-Am., Rhop. II, 494, pl. 94, fig. 30–34, 1900.
Holland, Butterfly Book 365, pl. XLVI, fig. 7, 8, 1898.
Draudt, Seitz's Macrolep. V, 938, pl. 182e, 1924.
*Pamphila melane* Wright, Butt. W. Coast 249, pl. XXXI, fig. 453, b, c, 1905.
*Poanes melane* Comstock, Butt. Cal. 225, pl. 62, fig. 6, 8, 9, 1927.

California, south into Mexico; March, April to June, September.

*Melane* and the female of *taxiles* are similar but they are not difficult to separate; usually the locality from which the specimens come is a sufficient criterion.

7. **Poanes aaroni** (Skinner). Pl. XXVII, fig. 7.
*Pamphila aaroni* Skinner, Ent. News I, 6, 1890. Cape May, New Jersey.
*Phycanassa aaroni* Holland, Butterfly Book 363, pl. XLVI, fig. 37, 1898.
*Paratrytone aaroni* Draudt, Seitz's Macrolep. V, 936, pl. 182b, 1924.

New Jersey, June to August.

*Aaroni* expands twenty-seven to thirty-three millimeters and is paler and more yellowish than *howardi*.

7a. race **howardi** Skinner.
*Pamphila howardi* Skinner, Can. Ent. XXVIII, 187, 1896. Florida.
*Phycanassa howardi* Holland, Butterfly Book 363, pl. XLVI, fig. 38, 1898.
† *Phycanassa viator* Id., (not Edwards), op. cit. pl. XLVI, fig. 14.
*Poanes aaroni* race *howardi* Skinner and Williams, Trans. Am. Ent. Soc. L, 60, 1924.

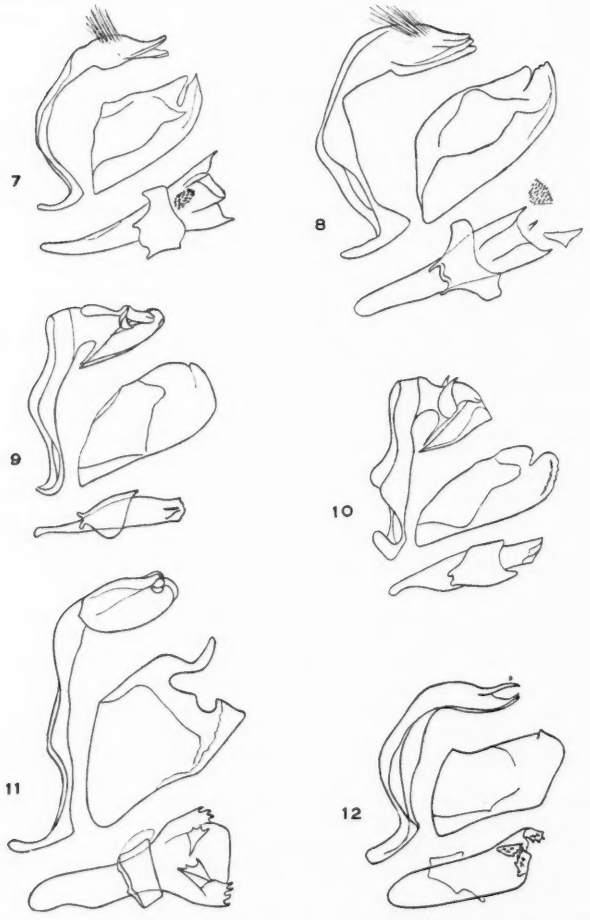





PLATE XXVII. MALE GENITALIA

**Fig. 7.** *Poanes aaroni*. **Fig. 8.** *P. yehl*. **Fig. 9.** *P. radians*. **Fig. 10.** *P. haitensis*. **Fig. 11.** *Problema byssus*. **Fig. 12.** *Atrytone arogos*.

*Paratrytone howardi* Draudt, Seitz's Macrolep. V, 936, pl. 182b, 1924.

Expanse from thirty-two to thirty-six millimeters. Color deeper and more fulvous than *aaroni*. We know the insect only from Florida but if it is a true race of *aaroni* the two must meet between their recorded areas.

8. **Poanes yehl** (Skinner). Pl. XXVII, fig. 8.

*Pamphila yehl* Skinner, Ent. News IV, 212, 1893. Florida.
*Limochores yehl* Holland, Butterfly Book 359, pl. XLVI, fig. 40, 1898.
Draudt, Seitz's Macrolep. V, 934, pl. 181i, 1924.

Tennessee and Virginia, south through Mississippi, Alabama, and Georgia; July to October.

Superficially this species looks more like a relative of *A. conspicua* but the mid tibiae are spined. The white spots on the under surface of the secondaries in the female are characteristic.

9. **Poanes radians** (Lucas). Pl. XXVII, fig. 9.

*Hesperia radians* Lucas, Sagra's Hist. Cuba VII, 650, 1857. Cuba.
*Hesperia magica* Plötz, Stett. ent. Zeit. XLIV, 202, 1883. Cuba.
*Pamphila streckeri* Skinner, Ent. News IV, 211, 1893. Florida.
*Choranthus radians* Draudt, Seitz's Macrolep. V, 941, pl. 182h, 1924.

Florida.

The males are variable in depth of color. We are unable to say with assurance that the species belongs here; it should probably be separated with *haitensis* in the genus *Choranthus*, but the only characters known to us for the separation are genitalic.

10. **Poanes haitensis** (Skinner). Pl. XXVII, fig. 10.

*Pamphila haitensis* Skinner, Ent. News IV, 211, 1893. Haiti and Santo Domingo.
*Choranthus haitensis* Skinner and Williams, Trans. Am. Ent. Soc. L, 61, fig. 10, (male gen.), 1924.

The Skinner and Williams reference mentions a male and a female caught on April third and sixth, 1901, respectively, at Gunntown, Levy Co., Florida, by Mr. Philip Laurent. It belongs near *radians* and if a separate genus be found desirable, will fall with that species in *Choranthus*.

## Genus **Problema** Skinner and Williams

Orthotype *Pamphila byssus* Edwards

*Problema* Skinner and Williams, Trans. Am. Ent. Soc. L, 62, 1924.

This genus was erected to receive *byssus* and *bulenta* and was originally based on differences of genitalic structure. The general structure of the included species falls within the range of variation of our *Atrytone*, but there seems to be a valid separation which leads us to retain *Problema*. Because of the close structural and superficial resemblance, however, we are retaining the old key to the species of both genera, with the addition of *dukesi* and *bulenta*. The type species of *Problema* has no stigma in the male, but Lindsey has tentatively assigned to the genus a British Guiana species with a stigma (*Problema morgani* Lindsey, Denison U. Bull. Jn. Sci. Lab. XXIII, 233, 1928). The stigma in this species differs in form from those of *Atrytone* species.

KEY TO THE SPECIES OF *Problema* AND *Atrytone*

1. Under surface of secondaries immaculate or with a faint pale transverse band on disk....2
   Under surface of secondaries with two pale rays....11
   Under surface with a few diffuse spots forming a curved transverse row *conspicua*
2. Fringe of inner margin of secondaries white....*bimacula*
   Fringe of this margin not white....3
3. Wings immaculate fuscous above and below or with a few small pale spots on primaries (female)....*vestris*
   Wings with more pale markings....4
4. Wings mostly dark brownish gray below....*palatka*
   Wings tinged with yellow or red below....5
5. Stigma present....male *arpa*
   Stigma absent....6
6. Upper surface of secondaries fuscous....7
   Secondaries with fulvous discal marks....8
7. Primaries with a transverse row of fulvous spots....female *arpa*
   With diffuse pale fulvous areas....female *arogos*
8. Veins black....9
   Veins not black....*arogos*
9. Under surface of secondaries immaculate yellow or brownish yellow....10
   Under surface usually with a visible but faint pale transverse band; never clear yellow....*byssus*
10. Wings broadly yellow-fulvous with a terminal fuscous band....*logan*
    Wings with a broad discal band formed of the usual spots, which are broadly confluent....*bulenta*
11. With preapical spots on the primaries....*dion*
    Without preapical spots....*dukesi*

1. **Problema byssus** (Edwards). Pl. XXVII, fig. 11.

   *Pamphila byssus* Edwards, Can. Ent. XII, 224, 1880. Indian River, Fla.

   *Limochores byssus* Holland, Butterfly Book, 358, pl. XLVI, fig. 20, 1898. Draudt, Seitz's Macrolep. V, 935, pl. 181k, 1924.

   *Atrytone kumskaka* Scudder, Can. Ent. XIX, 45, 1887. Iowa. Western States.

   Skinner, Ent. News XXXII, 276, 1921.

   Florida to Texas and Kansas; May to October.

2. **Problema bulenta** (Boisduval and LeConte).

   *Hesperia bulenta* Boisduval and LeConte, Lep. Am. Sept. pl. 67, fig. 1–5, 1833. North America.

   *Problema bulenta* Jones, Ent. News XXXVII, 193, pl. IX, fig. 1, 1a ♂, 2, 2a ♀, 1926.

After many years of obscurity this species has been rediscovered by Mr. F. M. Jones, who collected two males and three females on July 28, 1925, along the edge of the marshes west of Wilmington, N. C., and observed several others. In 1926 Bell also collected several specimens in the same place during the first part of July but to date the species has not been recorded from any other locality.

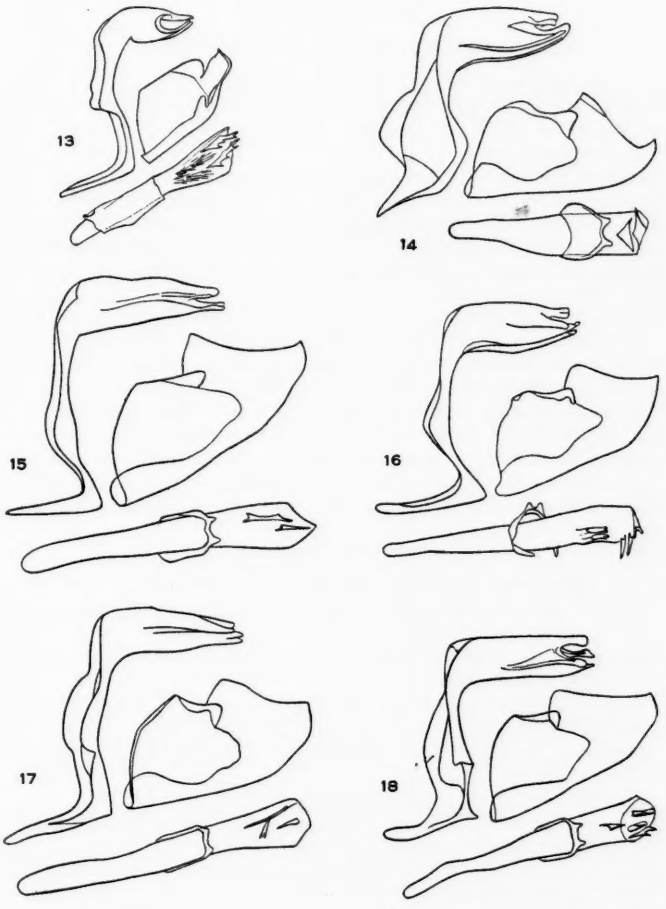





PLATE XXVIII. MALE GENITALIA OF *Atrytone*

Fig. 13. *logan*. Fig. 14. *arpa*. Fig. 15. *palatka*. Fig. 16. *dukesi*. Fig. 17. *dion*. Fig. 18. *conspicua*.

## Genus **Atrytone** Scudder

Orthotype *Hesperia iowa* Scudder

*Atrytone* Scudder, Rept. Peabody Acad. 1871, 77 (56), 1872.
*Euphyes* Id., op. cit. 80 (59). Orthotype *Hesperia metacomet* Harris.
*Anatrytone* Dyar, Jn. N. Y. Ent. Soc. XIII, 140, 1905. Orthotype *Hesperia delaware* Edwards.

Palpi upturned; second joint closely appressed, smoothly and deeply scaled; third moderate, oblique. Antennae about one-half as long as primaries; club long, moderately thick; apiculus about as long as thickness of club, sometimes a little shorter. Costa of primaries flattened or very slightly convex; outer margin moderately and almost evenly rounded; apex usually prominent. Secondaries rather small, rounded, slightly lobed at anal angle; a little more apically elongate in the female. Cell of primaries normal; discocellulars oblique, weak; vein $M_2$ curved, nearer to $M_3$ than to $M_1$; $Cu_2$ about intermediate between $Cu_1$ and base of wing. Stigma present or absent, composed of two similar slender elliptic pieces placed end to end on opposite sides of vein $Cu_2$. Mid tibiae without spines.

The long antennal club and spineless mid tibiae make this a very distinct genus as used here but no characters are available for the separation of *Atrytone* and *Euphyes* of the older literature except the male stigma, which is present only in the species formerly placed in *Euphyes*. The types of these two genera do not resemble each other closely but the remaining species form an excellent connecting series.

For a key to the species see the preceding genus.

1. **Atrytone arogos** (Boisduval and LeConte). Pl. XXVII, fig. 12.

† *Papilio vitellius* Abbot and Smith, (not Fabricius), Lep. Ins. Ga. I, 33, pl. XVII, 1797. Georgia.
*Hesperia arogos* Boisduval and LeConte, Lep. Am. Sept. pl. 76, fig. 3, 4, 5, 1833. North America.
*Hesperia iowa* Scudder, Proc. Bost. Soc. Nat. Hist. XI, 401, 1868.
*Hesperia mutius* Plötz, Stett. ent. Zeit. XLIV, 199, 1883.
† *Atrytone vitellius* Holland (not Fabricius), Butterfly Book 364, pl. XLVI, fig. 6, 1898.
*Atrytone arogos* Draudt, Seitz's Macrolep. V, 939, pl. 182g, 1924.

Florida to Alabama, March to May, August and September; north to New Jersey and west to Iowa and Kansas, June and July.

The pale tawny wings with their broad even fuscous borders distinguish the male; the female is readily associated with the male but the fuscous is more extensive, encroaching upon the discal area and often almost obliterating the tawny color.

2. **Atrytone logan** (Edwards). Pl. XXVIII, fig. 13.

*Hesperia logan* Edwards, Proc. Ent. Soc. Phil. II, 18, pl. I, fig. 5, 1863. Lansing, Michigan.
*Hesperia delaware* Id., op. cit. p. 19, pl. 5, fig. 2. Philadelphia.
† *Thymelicus jowa* Plötz (not Scudder), Stett. ent. Zeit. XLV, 287, 1884.
*Atrytone logan* Scudder, Butt. E. U. S. II, p. 1614, 1889.

*Atrytone delaware* Godman, Biol. Cent.-Am., Rhop. II, 490, pl. 94, fig. 4–6, 1900.
Holland, Butterfly Book 365, pl. XLVI, fig. 24, 1898.
Draudt, Seitz's Macrolep. V, 937, pl. 182 c, 1924.
Connecticut (July), south to Florida (March), and west to Montana, Nebraska and Arkansas, July and early August.

2a. race **lagus** Edwards.
*Pamphila lagus* Edwards, Trăns. Am. Ent. Soc. IX, 5, 1881. Oak Creek Canyon, Colorado.
Colorado, Wyoming and Texas, July and August.
This race is scarcely worth separating from *logan*. It has the fuscous borders more slender than those of *logan* and in extreme individuals has only a very narrow border.

3. **Atrytone arpa** (Boisduval and LeConte). Pl. XXVIII, fig. 14.
*Hesperia arpa* Boisduval and LeConte, Lep. Am. Sept. pl. 68, 1833. Georgia.
*Limochores arpa* Draudt, Seitz's Macrolep. V, 935, pl. 181k, 1924.
Florida, March to June, September and October. Alabama, August.
The stigma is present in the males of this and the remaining species of the genus, which make up the old genus *Euphyes*.

4. **Atrytone palatka** (Edwards). Pl. XXVIII, fig. 15.
*Hesperia pilatka* Edwards, Trans. Am. Ent. Soc. I, 287, 1867. St. Augustine, Florida.
*Hesperia floridensis* Plötz, Stett. ent. Zeit. XLIV, 196, 1883. Florida.
*Limochores palatka* Holland, Butterfly Book 358, pl. XLVI, fig. 21, 1898.
Draudt, Seitz's Macrolep. V, 935, pl. 181k, 1924.
Florida to Alabama; March to May, August to October.
In the original description the spelling *pilatka* was apparently an error, since Edwards himself amended the name in his later writings.

5. **Atrytone dion** (Edwards). Pl. XXVIII, fig. 17.
*Pamphila dion* Edwards, Can. Ent. XI, 238, 1879. Indiana.
*Hesperia diana* Plötz, Stett. ent. Zeit. XLVIII, 1886. St. Paulo.
† *Limochores palatka* Scudder (not Edwards), Butt. E. U. S. III, p. 1863, 1889.
The complete type information is: "Southern Shore of Lake Michigan, in Indiana, from Mr. Chas. E. Worthington; also from Mr. J. A. Moffat, of Hamilton, Ontario." Our records embrace the area from New York to North Carolina, west into Wisconsin, Nebraska, and Missouri; June to August.

5a. race **alabamae** Lindsey.
*Atrytone* (*Euphyes*) *dion* race *alabamae* Lindsey, Ent. News XXXIV, 210, 1923. Mobile Co., Alabama.
Bell, Jn. N. Y. Ent. Soc. XXXIV, 270, 1926.
The single male type has been supplemented by a female taken by Bell at Chickasaw, Alabama, on Sept. 1. These southern specimens have the fulvous spots much smaller than normal *dion* and the pale rays on the under surface of the secondaries less contrasting. The darkness of *alabamae* suggests *dukesi* but the apex of the primaries is sharper than in the latter species, at least one sub-

apical point is present, and the spots of the primaries are evident on the under surface.

6. **Atrytone dukesi** Lindsey. Pl. XXVIII, fig. 16.
*Atrytone (Euphyes) dukesi* Lindsey, Ent. News XXXIV, 209, 1923. Mobile Co., Alabama.
*Atrytone dukesi* Bell, Jn. N. Y. Ent. Soc. XXXIV, 269, 1926.

This interesting species was collected in considerable numbers in 1925 by Dr. van Aller and Mr. Lading of Mobile and by Mr. Bell during a short collecting trip near that city. It was on the wing from August 24 to October 11. The type series of four specimens was taken by Mr. W. C. Dukes, also of Mobile.

*Dukesi* is usually much darker than *dion*, with greatly restricted maculation, but the two approach in superficial appearance through the race *alabamae*. The absence of subapical spots, dark under surface of the primaries, and blunter apex, are apparently dependable characters for this species.

7. **Atrytone conspicua** (Edwards). Pl. XXVIII, fig. 18.
*Hesperia conspicua* Edwards, Proc. Ent. Soc. Phil. II, 17, pl. 5, fig. 5, 1863. Lansing, Michigan.
*Hesperia pontiac* Id., op. cit. p. 17, pl. XI, fig. 5. Lansing, Michigan.
*Hedone orono* Scudder, Rept. Peabody Acad. 1871, 79 (58), 1872. Northern States.
*Limochores pontiac* Scudder, Butt. E. U. S. II, p. 1732, 1889.
Holland, Butterfly Book 358, p. 1732, 1889.
Draudt, Seitz's Macrolep. V, 934, pl. 181i, 1924.
New Jersey to Massachusetts and west into Nebraska; July and August.

8. **Atrytone bimacula** (Grote and Robinson). Pl. XXIX, fig. 19.
*Hesperia bimacula* Grote and Robinson, Ann. Lyc. Nat. Hist. N. Y. VIII, 433, 1867. Atlantic District, Philadelphia.
*Hesperia acanootus* Scudder, Proc. Bost. Soc. Nat. Hist. XI, 381, 1868. Lexington, Massachusetts.
*Hesperia illinois* Dodge, Can. Ent. IV, 217, 1872. Bureau Co., Illinois.
*Limochores bimacula* Scudder, Butt. E. U. S. II, p. 1718, 1889.
Draudt, Seitz's Macrolep. V, 934, pl. 181h, 1924.
Ontario to New Jersey, westward into Nebraska; July.

The under surface of the secondaries is usually pale with the veins marked in white. The upper surface has a little yellow-fulvous on each side of the stigma in the male, and only two or three small extradiscal spots in the female, of a very pale color. The species is rare.

9. **Atrytone ruricola** (Boisduval). Pl. XXIX, fig. 20.
*Hesperia ruricola* Boisduval, Ann. Soc. Ent. France (2), X, 317, 1852. California.
Holland, Ent. News XL, 326, 1929.
*Hesperia vestris*, Boisduval, op. cit. p. 317. California.
Oberthür, Edudes Lep. Comp. IX (I), pl. CCXL, fig. 2093, 1913. Type.
*Hesperia metacomet* Harris, Ins. Inj. Veg. 3rd. ed., 317, 1862. Massachusetts.
*Pamphila rurea* Edwards, Proc. Acad. Nat. Sci. Phil. 58, 1862. Rock Island, Illinois.

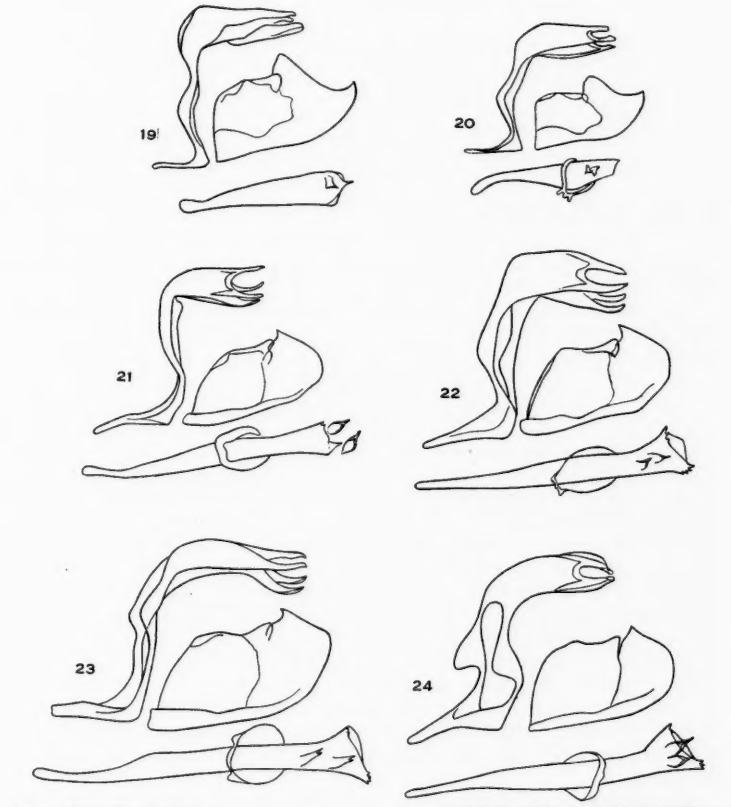





PLATE XXIX. MALE GENITALIA

Fig. 19. *Atrytone bimacula*. Fig. 20. *A. ruricola*. Fig. 21. *Atrytonopsis loammi*. Fig. 22. *A. hianna*. Fig. 23. *A. deva*. Fig. 24. *A. pittacus*.

*Hesperia kiowah* Reakirt, Proc. Ent. Soc. Phil. VI, 150, 1866. Rocky Mts.
*Hesperia osyka* Edwards, Trans. Am. Ent. Soc. I, 288, 1867. New Orleans.
*Pamphila osceola* Lintner, 30th Rept. N. Y. Mus. Nat. Hist. 170, 1878. New York.
*Pamphila californica* Mabille, Bull. Soc. Ent. Belg. 68, 1883. California.
*Euphyes metacomet* Scudder, Butt. E. U. S. II, p. 1739, 1889.
Holland, Butterfly Book 360, pl. XLVI, fig. 31, 1898.
Draudt, Seitz's Macrolep. V, 935, pl. 182a, 1924.
*Pamphila vestris* Wright, Butt. W. Coast 247, pl. XXXI, fig. 442, 1905.
*Atrytone vestris* Comstock, Butt. Cal. 224, pl. 62, fig. 4, 1927.
United States and Southern Canada, May to September.

9a. female form **immaculatus** Williams.

*Pamphila vestris* var. *immaculatus* Williams, Ent. News XXV, 267, 1914.

Described from the Jemez Mountains of New Mexico. It has been taken also in the White Mountains of Arizona and in Colorado, June and July.

As the name implies, this form lacks the whitish spots which are found on the wings of the normal female.

## Genus **Atrytonopsis** Godman

Orthotype *Hesperia deva* Edwards

*Atrytonopsis* Godman, Biol. Cent.-Am., Rhop. II, 497, 1900.

Palpi upturned; third joint moderate, oblique, not concealed in vestiture of second. Antennae slightly less than one-half as long as primaries; club moderate, longer in female than in male; apiculus shorter than thickness of club in male, equal to it or longer in female. Primaries of male apically produced; costa nearly straight; outer margin slightly rounded and apex rounded-acute. Secondaries rounded, outer margin flattened at end of cell, anal angle slightly lobed; length from humeral angle to anal angle greater than through cell in male and less in female. Cell of primaries three-fifths as long as wing; vein $M_2$ curved at base, nearer to $M_3$ than to $M_1$; lower discocellular almost transverse, middle discocellular scarcely visible, very oblique. Vein $Cu_2$ almost intermediate between $Cu_1$ and base of wing. Stigma rudimentary, consisting of a few modified scales faintly indicating the position of the structure; well developed in a few species, where it is similar to that of *Atrytone* but more slender. Mid tibiae spiny. Pl. XVII, fig. 8.

The absence of yellow-fulvous, frequent occurrence of gray scales on the under surface of the wings, and acute apex of the male primaries give this genus a very distinctive habitus.

### Key to the Species

1. Fringes not checkered.....2
   Fringes checkered.....7
2. Under surface of secondaries with a transverse row and three subbasal white spots; not heavily gray-powdered.....*loammi*
   Spots partly obsolete or hyaline.....3

3. Secondaries with hyaline spots.....*pittacus*
   Secondaries without hyaline spots.....4
4. Fringes of secondaries white or whitish.....5
   Fringes concolorous with wings or slightly paler.....6
5. Fringes dirty white, usually dark at anal angle.....*lunus*
   Fringes pure white, rarely intermixed with dark scales, usually not very dark at anal angle.....*deva*
6. Wings very dark.....*hianna*
   Wings pale.....*vierecki*
7. Under surface marbled with purplish-gray; spots semihyaline.....*cestus*
   Under surface heavily gray-powdered.....8
8. Spots yellowish, opaque or nearly so.....*python*
   Spots white, subhyaline.....*edwardsi*

1. **Atrytonopsis loammi** (Whitney). Pl. XXIX, fig. 21.

*Lerema loammi* Whitney, Can. Ent. VIII, 76, 1876. Jacksonville, Florida.
*Pamphila regulus* Edwards, Trans. Am. Ent. Soc. IX, 5, 1881. St. Johns River, Orange Co., Florida.
*Pamphila loammi* Skinner, Ent. News XI, pl. II, fig. 24, 1900.
*Parnara apostologica* Strand, Archiv. f. Naturges. LXXXVI, (1920), abt. A, heft 7, p. 160, 1921. Florida.

Florida, March, April, and October; North Carolina, July.

The dark brown ground color and pure white opaque spots of the under surface of the secondaries separate *loammi* readily from the rest of the genus.

2. **Atrytonopsis hianna** (Scudder). Pl. XXIX, fig. 22.

*Hesperia hianna* Scudder, Proc. Bost. Soc. Nat. Hist. XI, 382, 1868. Quincy and Dorchester, Massachusetts.
*Hesperia grotei* Plötz, Stett. ent. Zeit. XLIV, 54, 1883. "Union."
*Lerema hianna* Scudder, Butt. E. U. S. II, p. 1771, 1889. Holland, Butterfly Book 366, pl. XLVI, fig. 9, 10, 1898.
*Atrytonopsis hianna* Draudt, Seitz's Macrolep. V, 940, pl. 182i, 1924.

Northeastern United States westward into Nebraska and Manitoba; May and June.

3. **Atrytonopsis lunus** (Edwards). Pl. VII, fig. 5.

*Pamphila lunus* Edwards, Papilio IV, 56, 1884. Arizona.
*Atrytonopsis lunus* Williams, Trans. Am. Ent. Soc. LVI, 137, fig. 1 (male gen.), 1930.

Arizona, June to August.

Similar to *deva* but larger and darker, and with the white areas not so pure as in *deva*.

4. **Atrytonopsis deva** (Edwards). Pl. XXIX, fig. 23.

*Hesperia deva* Edwards, Trans. Am. Ent. Soc. V, 292, 1876. Prescott, Arizona.
*Atrytonopsis deva* Godman, Biol. Cent.-Am., Rhop. II, 498, pl. 95, fig. 6-10, 1900.
Draudt, Seitz's Macrolep. V, 940, pl. 182h, 1924.

Arizona, Utah, and Southern Colorado; May and June.

5. **Atrytonopsis vierecki** (Skinner). Pl. XXX, fig. 25.

*Pamphila vierecki* Skinner, Ent. News XIII, 213, 1902. Dry Canyon, Alamagordo, New Mexico.

Texas and New Mexico, April to June.

*Vierecki* is similar to *deva* but smaller, paler, and more grayish, with two spots in the end of the cell of the primaries, sometimes connected, and a well-marked stigma in the male.

6. **Atrytonopsis pittacus** (Edwards). Pl. XXIX, fig. 24.

*Pamphila pittacus* Edwards, Papilio II, 138, 1882. Ft. Grant or Mt. Graham, Arizona.

Skinner, Ent. News XI, 414, pl. II, fig. 17, 18, 1900.

*Atrytonopsis pittacus* Godman, Biol. Cent.-Am., Rhop. II, 498, pl. 95, fig. 11–13, 1900.

Draudt, Seitz's Macrolep. V, 940, pl. 182i, 1924.

Arizona, May and July; Texas, March and April.

The straight row of hyaline spots on the secondaries characterizes *pittacus* among our species.

7. **Atrytonopsis python** (Edwards). Pl. XXX, fig. 26.

*Pamphila python* Edwards, Papilio II, 139, 1882. Ft. Grant or Mt. Graham, Arizona.

*Atrytonopsis python* Draudt, Seitz's Macrolep. V, 940, pl. 182i, 1924.

Arizona, March to August; Texas, May.

*Python* is the only member of our fauna in which the spots are distinctly yellowish.

7a. form **margarita** Skinner.

*Pamphila margarita* Skinner, Can. Ent. XLV, 426, 1913. Jemez Springs, New Mexico.

This form has the spots white or hyaline and not tinged with yellow as in typical *python*. It runs in our key to *edwardsi* but the distribution of the two is not known to overlap.

8. **Atrytonopsis cestus** (Edwards). Pl. XXX, fig. 27.

*Pamphila cestus* Edwards, Papilio IV, 57, 1884. S. Arizona.

Skinner and Williams note that *cestus* differs from the related species, *edwardsi* and *pittacus*, in having the outer spot on the secondaries out of line, and the spots rectangular, not rounded.

9. **Atrytonopsis edwardsi** Barnes and McDunnough. Pl. XXX, fig. 28.

† *Pamphila cestus* Wright (not Edwards), Butt. W. Coast 249, pl. XXXII, fig. 482, 1905.

*Atrytonopsis edwardsi* Barnes and McDunnough, Contributions III (2), 135, pl. VIII, fig. 9, 10, 1916. Redington and Baboquivari Mts., Arizona.

Arizona, March to August.

The relationship of this species and *ovinia* Hewitson which was mentioned in the first edition of this work is still unsettled. *Ovinia* is illustrated by Godman in the *Biologia*, pl. 97, fig. 1, 2.

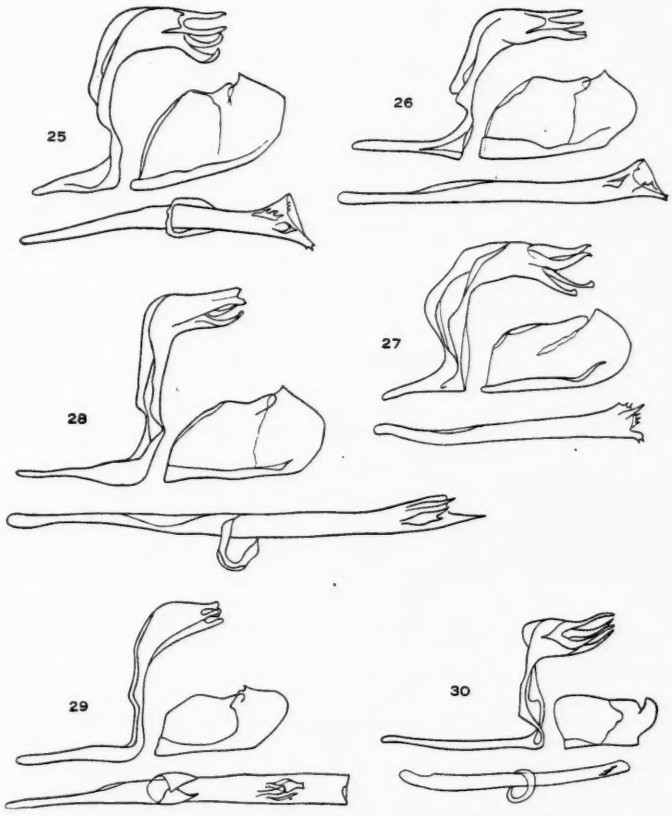





PLATE XXX. MALE GENITALIA

Fig. 25. *Atrytonopsis vierecki*. Fig. 26. *A. python*. Fig. 27. *A. cestus*. Fig. 28. *A. edwardsi*. Fig. 29. *Oligoria maculata*. Fig. 30. *Lerema accius*.

9a. ab. **polingi** Gunder.

*Atrytonopsis edwardsi* ab. *polingi* Gunder, Ent. News XXXVI, 195, pl. V, fig. 3, 1925. Baboquivari Mts., Arizona.

This aberration has immaculate secondaries.

### Genus **Oligoria** Scudder

Orthotype *Hesperia maculata* Edwards

*Oligoria* Scudder, Rept. Peabody Acad. 82 (61), 1872.

Structure not much different from *Atrytonopsis*. Male primaries less apically produced and without stigma. Vein $M_2$ nearer to $M_3$ than in the preceding genus. Middle tibiae with a few long spines. Apiculus of antennae abruptly constricted, sharply reflexed, very slender, and usually about twice as long as thickness of club.

1. **Oligoria maculata** (Edwards). Pl. XXX, fig. 29.

*Hesperia maculata* Edwards, Proc. Ent. Soc. Phil. IV, 202, pl. I, fig. 6, 1865. New Orleans.

*Cobalus grossula* Herrich-Schaeffer, Corr.-Blatt Regensb. XXIII, 202, 1869. Tropical America.

*Cobalus deleta* Id., op. cit. 202. Tropical America.

*Hesperia norus* Plötz, Stett. ent. Zeit. XLIV, 36, 1883. (New name.)

*Oligoria maculata* Scudder, Butt. E. U. S. II, p. 1761, 1889.
Holland, Butterfly Book 361, pl. XLVI, fig. 35, 1898.
Draudt, Seitz's Macrolep. V, 935, pl. 181a, 1924.

*Hesperia orthomenes* Scudder (Boisd. ms.), Butt. E. U. S. II, p. 1761, 1889.

Florida, February to July; Alabama, August and September.

### Genus **Lerema** Scudder

Orthotype *Papilio accius* Abbot and Smith

*Lerema* Scudder, Rept. Peabody Acad. 1871, 82 (61), 1872.

Palpi oblique; third joint moderate, partly concealed by vestiture of second. Antennae about one-half as long as primaries; club moderate, apiculus slender, longer than thickness of club. Primaries rather long, costa flattened in middle; outer margin curved, flattened before anal angle; apex rounded-rectangular. Secondaries lobed slightly at anal angle, otherwise rounded. Cell of primaries over three-fifths as long as wing; discocellulars weak, slightly oblique; vein $M_2$ arising a little nearer to $M_3$ than to $M_1$, almost straight. Male with a slender, well-developed stigma running from the base of vein $Cu_1$ to just within the middle of vein A. Middle tibiae with a few long spines. Pl. XVII, fig. 8.

1. **Lerema accius** (Abbot and Smith). Pl. XXX, fig. 30.

*Papilio accius* Abbot and Smith, Lep. Ins. Ga. I, 45, pl. 23, 1797. Georgia.

*Hesperia monoco* Scudder, Proc. Ess. Inst. III, 178, 1863. Connecticut.

*Hesperia punctella* Grote and Robinson, Trans. Am. Ent. Soc. I, 1, 1867. Georgia.

*Hesperia nortonii* Edwards, Trans. Am. Ent. Soc. I, 287, 1867. New Orleans.

*Lerema pattenii* Scudder, Rept. Peabody Acad. 1871, 82, (61), 1872. Guatemala.
*Hesperia dido* Plötz, Stett. ent. Zeit. XLIV, 53, 1883. Venezuela.
*Hesperia phocylides* Id., op. cit. p. 52. Laguayra.
*Lerema accius* Scudder, Butt. E. U. S. II, 1768, 1889.
Holland, Butterfly Book 366, pl. XLVIII, fig. 8, 1898.
Godman, Biol. Cent.-Am., Rhop. II, 554, pl. 99, fig. 44, 1900.
Draudt, Seitz's Macrolep. V, 967, pl. 187b, 1924.
*Hesperia chamis* Scudder, (Boisd. ms.), op. cit. p. 1768, 1889.

The type locality of Scudder's *monoco*, Connecticut, is the northernmost record known to us. The species ranges southward throughout this country east of the Rockies and through Central America. In the southern part of our area it apparently flies in all months of the year and in more northern localities during all warm months.

## Genus **Phemiades** Hübner

Logotype *Papilio phineus* Cramer

*Phemiades* Hübner, Verz. bek. Schmett. 112, 1820.

1. **Phemiades antiqua** (Herrich-Schaeffer).
*Pamphila antiqua* Herrich-Schaeffer, Corr.-Blatt. Regensb. XVII, 142, 1863. Cuba.
*Phemiades utha* Hewitson, Desc. Hesp. 37, 1868. Cuba.
*Phemiades jamaicensis* Barnes and Benjamin, Bull. S. Cal. Acad. XXV, 25, 1926.
*Pyrrhocalles antiqua* Draudt, Seitz's Macrolep. V, 947, pl. 183f, g, 1924.

Barnes and Benjamin listed this species from the United States on the basis of a specimen in the Barnes collection labelled Florida. Lindsey recalls the specimen and regards the label as of doubtful accuracy. Dr. Barnes received a considerable number of specimens with Florida labels which had to be set aside as doubtful. If the species does enter Florida it is *antiqua* and not the form *jamaicensis* according to Williams' studies.

## Genus **Amblyscirtes** Scudder

Orthotype *Hesperia vialis* Edwards

*Amblyscirtes* Scudder, Rept. Peabody Acad. 1871, 75 (54), 1872.
*Stomyles* Id., op. cit. 76 (55). Orthotype *Pyrgus textor* Hübner.
*Mastor* Godman, Biol. Cent.-Am., Rhop. II, 567, 1900. Orthotype *Mastor anubis* Godman.
*Epiphyes* Dyar, Jn. N. Y. Ent. Soc. XIII, 132, 1905. Orthotype *Pamphila carolina* Skinner.

Palpi large, upturned; second joint with shaggy vestiture, third slender, smooth, and vertical, almost as long as second in most species. Antennae moderate; club large; apiculus longer than thickness of club. Primaries in most species similar in the two sexes, less produced apically than in the related genera; costa

flattened; apex rounded-rectangular; outer margin strongly rounded except toward anal angle; cell about three-fifths as long as wing; discocellulars very weak and only slightly oblique; vein $M_2$ weakly curved toward base, a little nearer to $M_3$ than to $M_1$. Secondaries rounded, in most of the species longer through cell than in related genera. Male stigma small, sometimes scarcely visible, composed of a short oblique dash above the base of vein $Cu_2$ and a smaller longitudinal dash below it. Middle tibiae spiny. Pl. XVII, fig. 8; Pl. XXV, fig. 3.

The diversity of characters in the old genus *Amblyscirtes*, particularly the short third palpal joint of *exoteria*, makes the limitation of genera in this group particularly difficult. The weight of opinion favors the inclusion of the species formerly placed in *Mastor*, and there is no more reason for retaining a special genus for *carolina*. The genitalia of all of these species are remarkably uniform in structure. *Fusca*, which was placed in *Mastor* in the first edition of this work, has genitalia much more like those of *eufala*, so we are including it with that species in *Lerodea*.

The record of *elissa* which formerly appeared in this genus has proved to be based on an error; apparently the species does not enter our area.

### Key to the Species

1. Fringes checkered....4
   Fringes not checkered....2
2. Wings with distinct yellow spots....*carolina*
   Wings with a few indistinct spots or none....3
3. Vestiture of head and fringes of wings golden....*bellus*
   Head golden, fringes whitish....*phylace*
   Without golden vestiture....*oslari*
4. Vestiture of under surface of secondaries with no suggestion of green....5
   Under surface of secondaries more or less greenish....12
5. Spots on under surface of secondaries connected by pale lines on veins *textor*
   No such lines....6
6. Under surface of secondaries with diffused pale spots or immaculate....7
   With sharply defined pale spots....11
   With a brown patch in the middle....*nysa*
7. All maculation above yellow-fulvous....*cassus*
   Subapical spots of primaries, at least, whitish to yellowish-white....8
8. Secondaries without pale spots below....*vialis*
   With a transverse row of powdery pale spots....9
9. Maculation of upper surface tinged with yellow-fulvous....13
   No trace of yellow-fulvous....10
10. Irroration of under surface smooth, fine....*alternata*
    Irroration with a coarse, rough appearance....*celia*
11. Under surface dark, irroration sparse; spots small and powdery but sharply contrasting....*exoteria*
    Under surface finely and smoothly grayish-irrorate; spots very sharply defined, moderate....*eos*

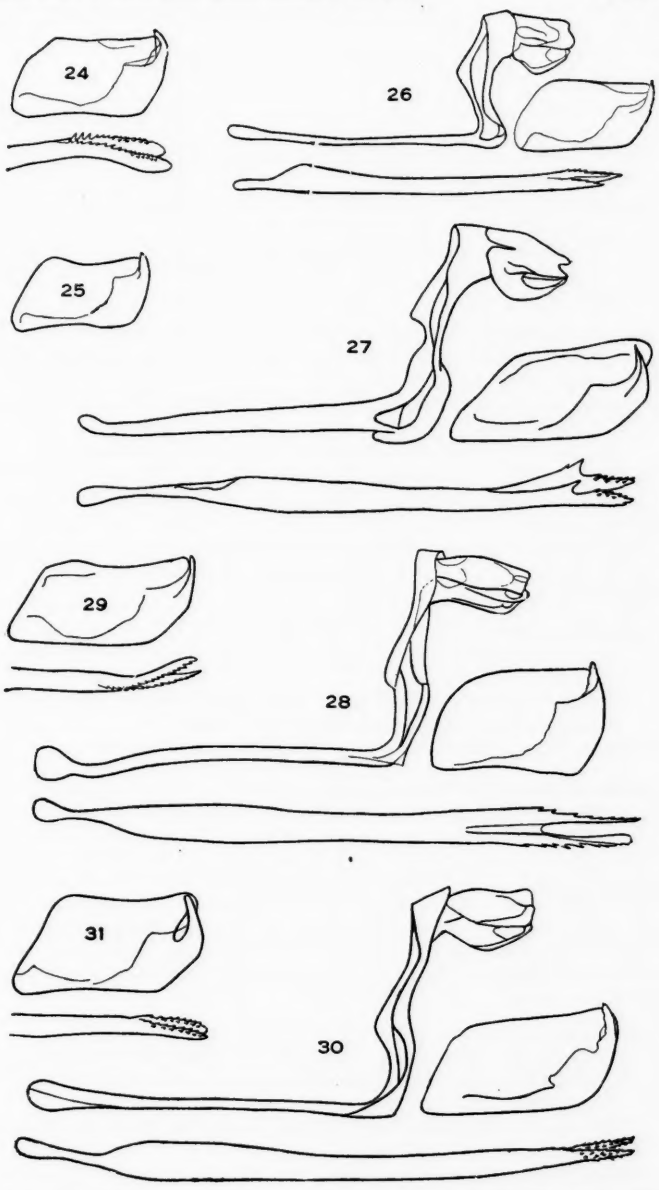





PLATE XXXI. MALE GENITALIA OF *Amblyscirtes*

Fig. 24. *celia*. Fig. 25. *aenus*. Fig. 26. *cassus*. Fig. 27. *exoteria*. Fig. 28. *carolina*. Fig. 29. *oslari*. Fig. 30. *bellus*. Fig. 31. *phylace*.

12. Under surface pale greenish-gray; primaries with spots between veins $M_1$ and $M_3$ above; southwestern.....*nereus*
Darker greenish-gray, very bright in fresh specimens; spots at end of cell usually lacking; eastern.....*hegon*
13. Underside of primaries with cell reddish-fulvous; ground color very dark; spots scarcely tinged with yellow-fulvous.....*aenus*
Cell brown, scarcely or not at all touched with reddish fulvous; general color paler; spots distinctly tinged with yellow-fulvous, though less than in *cassus*.....*texanae*

1. **Amblyscirtes exoteria** (Herrich-Schaeffer). Pl. XXXI, fig. 27.
*Goniloba exoteria* Herrich-Schaeffer, Corr.-Blatt Regensb. XXIII, 196, 1869. Tropical America.
*Amblyscirtes nanno* Edwards, Papilio II, 142, 1882. Ft. Grant or Mt. Graham, Arizona.
Godman, Biol. Cent.-Am., Rhop. II, 504, pl. 95, fig. 31–34, 1900.
Wright, Butt. W. Coast 250, pl. XXXI, fig. 455, 1905.
*Amblyscirtes exoteria* Draudt, Seitz's Macrolep. V, 942, pl. 183a, 1924.
Arizona, July.

The primaries of *exoteria* are more produced apically and the secondaries are *relatively* smaller than in the related species of *Amblyscirtes*; in addition it has a shorter terminal joint on the palpi.

2. **Amblyscirtes aenus** Edwards. Pl. XXXI, fig. 25.
*Amblyscirtes aenus* Edwards, Field and Forest III, 118, 1878. Southern Colorado.
Holland, Butterfly Book 341, pl. XLVII, fig. 7, 1898.
Draudt, Seitz's Macrolep. V, 942, pl. 183a, 1924.
Colorado, Texas, New Mexico, and Arizona; May to September.

3. **Amblyscirtes texanae** Bell. Pl. XXV, fig. 8.
*Amblyscirtes texanae* Bell, Bull. Brooklyn Ent. Soc. XXII, 203, 1927. Alpine, Texas.

The type series of twenty-four specimens was taken by Mr. O. C. Poling in Brewster County, Texas, during the four months from April to July, inclusive. It is a distinct and beautiful species which seems nearest to *cassus* but differs in many details. Among these differences may be mentioned the paler color and the presence of a rounded spot in the cell of the primaries, while *cassus* has two, sometimes confluent. The characters noted in the key are sufficient to distinguish *texanae* from *aenus*.

4. **Amblyscirtes cassus** Edwards. Pl. XXXI, fig. 26.
*Amblyscirtes cassus* Edwards, Papilio III, 72, 1883. Mt. Graham, Arizona.
† *Amblyscirtes simius* Wright (not Edwards), Butt. W. Coast 249, pl. XXXI, fig. 454, b, 1905.
† *Stomyles simius* Draudt (not Edwards), Seitz's Macrolep. V, 943, pl. 183b, 1924.
Arizona; June, July and September.

The under surface of the secondaries of *cassus* is heavily irrorate with pale gray scales which give these wings a roughened appearance. The spots are large and distinct but are vaguely defined.

5. **Amblyscirtes celia** Skinner. Pl. XXXI, fig. 24.

*Amblyscirtes celia* Skinner, Ent. News VI, 113, 1895. Blanco, Comal, and Nueces Counties, Texas.

Draudt, Seitz's Macrolep. V, 942, 1924.

Texas; March, April, and July.

The under surface of the secondaries is finely but rather sparsely and roughly powdered with gray; spots small and not clear-cut.

6. **Amblyscirtes vialis** (Edwards). Pl. XVIII, fig. 17.

*Hesperia vialis* Edwards, Proc. Acad. Nat. Sci. Phil. 58, 1862. Rock Island, Illinois.

*Amblyscirtes vialis* Scudder, Butt. E. U. S. II, p. 1582, 1889.

Holland, Butterfly Book, 340, pl. XLVII, fig. 5, 1898.

Draudt, Seitz's Macrolep. V, 942, pl. 183a, 1924.

Comstock, Butt. Cal. 225, pl. 62, fig. 12, 13, 1927.

North Carolina to New Mexico and California, northward into Canada; May to September, occurring at different periods in different parts of its range. The species which flies in the southeastern states is apparently different.

7. **Amblyscirtes hegon** (Scudder). Pl. XVIII, fig. 19.

*Hesperia hegon* Scudder, Proc. Ess. Inst. III, 176, 1863. White Mts.

*Hesperia samoset* Id., op. cit. 176. Massachusetts and New Hampshire.

*Hesperia nemoris* Edwards, Proc. Ent. Soc. Phil. II, 507, 1864. Portsmouth, Ohio.

*Amblyscirtes samoset* Scudder, Butt. E. U. S. II, p. 1589, 1889.

Holland, Butterfly Book 340, pl. XLVII, fig. 6, 1898.

*Stomyles samoset* Draudt, Seitz's Macrolep. V, 943, pl. 183b, 1924.

Southeastern Canada to Georgia and west to central Iowa; May and June, sometimes as late as August in the north.

*Hegon* is similar to *nereus* but the transverse row of spots on the primaries is usually less complete and fresh specimens are much more greenish below. The distribution is sufficient to separate specimens if their source is known.

8. **Amblyscirtes nereus** (Edwards). Pl. XVIII, fig. 20.

*Hesperia nereus* Edwards, Trans. Am. Ent. Soc. V, 207, 1876. South Apache, Arizona.

*Stomyles nereus* Godman, Biol. Cent.-Am., Rhop. II, 502, pl. 95, fig. 27–30, 1900.

Draudt, Seitz's Macrolep. V, 943, pl. 183b, c, 1924.

Arizona to Texas; June to August.

9. **Amblyscirtes alternata** (Grote and Robinson). Pl. XVIII, fig. 18.

*Hesperia alternata* Grote and Robinson, Trans. Am. Ent. Soc. I, 3, 1867. Georgia.

*Amblyscirtes meridionalis* Dyar, Jn. N. Y. Ent. Soc. XIII, 135, 1905. Georgia and Florida.

Florida, February and March; Alabama, March, August, and September; North Carolina, July.

The primaries of this species are apically produced, so that the outer margin

is longer than in *vialis*, and the fringes are an unusually pure white, as in *nysa*. The under surface has a transverse row of faint powdery spots on the secondaries and is otherwise similar to *vialis*.

10. **Amblyscirtes nysa** Edwards. Pl. XVIII, fig. 21.

*Amblyscirtes nysa* Edwards, Can. Ent. IX, 191, 1877. Texas.
Draudt, Seitz's Macrolep. V, 942, 1924.
*Pamphila similis* Strecker, Lep. Rhop. Het. 131, 1878. New Braunfels, Texas.

Texas and Arizona; March to July.

The under surface of the secondaries is distinctive and the fringes are a clearer white than in any other species except *alternata*. The upper surface of *nysa* is very similar to that of *alternata* in every way.

11. **Amblyscirtes eos** (Edwards). Pl. XVIII, fig. 23.

*Hesperia eos* Edwards, Trans. Am. Ent. Soc. III, 276, 1871. Dallas, Texas.
Lindsey, Ent. News XXXIX, 91, 1928.
*Hesperia comus* Edwards, op. cit. V, 206, 1876. Texas.
*Amblyscirtes nilus* Id., Field and Forest III, 118, 1878. Texas.
*Stomyles comus* Godman, Biol. Cent.-Am., Rhop. II, 502, pl. 95, fig. 25, 26, 1900.
Draudt, Seitz's Macrolep. V, 943, pl. 183b, 1924.
*Pamphila quinquemacula* Skinner, Ent. News XXII, 413, 1911. Las Cruces, New Mexico.

Texas to Arizona, March to September.

The under surface is finely and smoothly grayish irrorate and the spots are small, white, sharply defined, and not crowded together. The maculation of the under surface is so characteristic that there can be no doubt of the synonymy.

12. **Amblyscirtes textor** (Hübner). Pl. XVIII, fig. 22.

*Pyrgus textor* Hübner, Zutr. exot. Schmett. pl. 89, fig. 515, 516, 1925. U. S. North America.
*Hesperia oneko* Scudder, Proc. Ess. Inst. III, 176, 1863. Connecticut.
*Hesperia wakulla* Edwards, Trans. Am. Ent. Soc. II, 311, 1869. Apalachicola, Florida.
*Amblyscirtes textor* Holland, Butterfly Book 341, pl. XLVII, fig. 16, 1898.
*Stomyles textor* Draudt, Seitz's Macrolep. V, 943, pl. 183b, 1924.

North Carolina to Alabama and west to Texas; April, May, August, and September in various parts of its range.

The underside of the secondaries is very strikingly different from the other species of the genus.

13. **Amblyscirtes carolina** (Skinner). Pl. XXXI, fig. 28.

*Pamphila carolina* Skinner, Ent. News III, 222, 1892. South of Hamlet, Richmond Co., North Carolina.
*Lerema carolina* Holland, Butterfly Book 367, pl. XLVI, fig. 36, 1898. Type.
*Amblyscirtes carolina* Jones, Ent. News XXXVII, 193, pl. IX, fig. 5, 5a, ♀, 1926.
*Atrytone carolina* Draudt, Seitz's Macrolep. V, 939, pl. 182g, 1924.

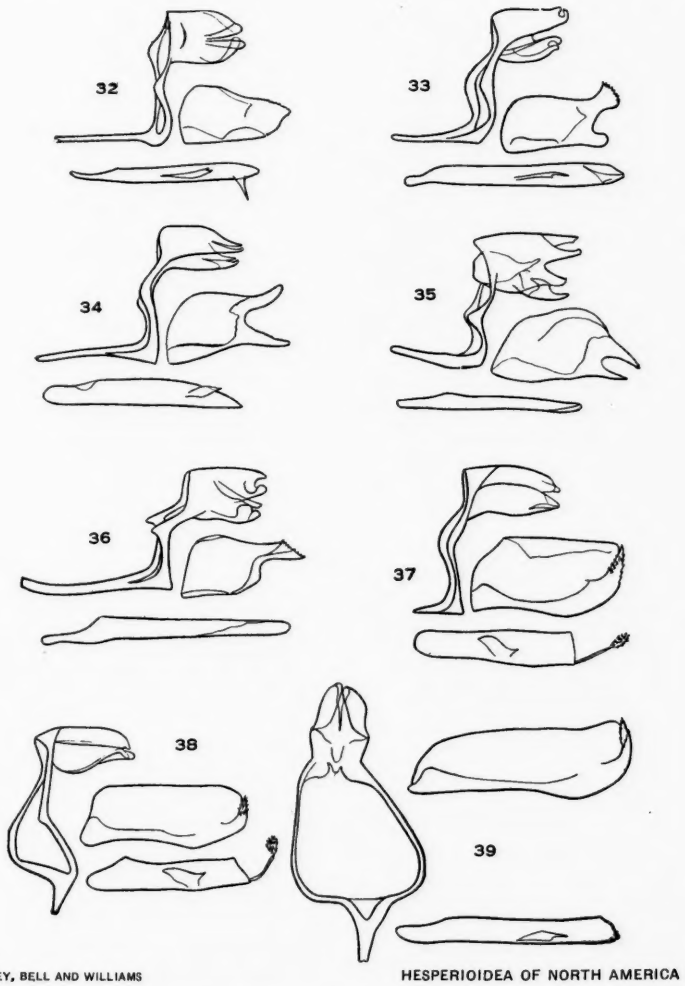





PLATE XXXII. MALE GENITALIA

Fig. 32. *Lerodea l'herminieri*. Fig. 33. *L. neamathla*. Fig. 34. *L. arabus*. Fig. 35. *L. eufala*. Fig. 36. *L. tripunctus*. Fig. 37. *Prenes panoquinoides*. Fig. 38. *P. errans*. Fig. 39. *P. panoquin*.

North Carolina and Virginia, July.

The species is easily recognized by the dark brown wings, pale yellow spots, and large stigma.

13a. ab. **reversa** Jones.

*Amblyscirtes carolina* var. *reversa* Jones, Ent. News XXXVII, 197, pl. IX, fig. 3, 3a, ♂; 4, ♀, 1926. Suffolk, Virginia, etc.

*Reversa* is characterized by the dark under surface with yellow spots; in normal *carolina* the under surface is brownish yellow with darker spots.

14. **Amblyscirtes bellus** (Edwards). Pl. XXXI, fig. 30.

*Pamphila bellus* Edwards, Papilio IV, 57, 1884. Southern Arizona.
Skinner, Ent. News XI, 414, pl. II, fig. 11, 12, 1900.
Wright, Butt. W. Coast 247, pl. XXXI, fig. 443, 1905.
*Mastor bellus* Draudt, Seitz's Macrolep. V, 972, pl. 187h, 1924.

Arizona, May to July.

15. **Amblyscirtes phylace** (Edwards). Pl. XXXI, fig. 31.

*Pamphila phylace* Edwards, Field and Forest III, 117, 1878. Southern Colorado.
*Mastor phylace* Draudt, Seitz's Macrolep. V, 972, pl. 187g, 1924.
*Amblyscirtes phylace* Comstock, Butt. Cal. 226, pl. 62, fig. 17, 22, 1927.

Texas to Arizona, Colorado; May to July.

16. **Amblyscirtes oslari** (Skinner). Pl. XXXI, fig. 29.

*Pamphila oslari* Skinner, Ent. News X, 112, 1899. Chimney Gulch, Colorado.

Texas to Arizona, Colorado, western Nebraska; April to August.

*Oslari* is usually pale fuscous above but occasionally shows some yellow-fulvous scales on the disk of the primaries and a faint trace of indefinite spots such as are always present in *A. exoteria*. Such specimens may be separated from *exoteria* by the gray under surface of the secondaries with vague pale spots instead of well defined markings.

## Genus **Lerodea** Scudder

Orthotype *Hesperia eufala* Edwards

*Lerodea* Scudder, Rept. Peabody Acad. 1871, 80 (59), 1872.
*Cymaenes* Id., op. cit. 82 (61). Orthotype *Cobalus tripunctus* Herrich-Schaeffer.
*Megistias* Godman, Biol. Cent.-Am., Rhop. II, 571, 1900. Orthotype *Hesperia tripunctata* Latreille.

Palpi upturned, very smoothly scaled; third joint about half as long as second but buried in vestiture of second almost to its tip. Antennae much less than one-half as long as primaries; apiculus slender, shorter than thickness of club. Primaries apically produced; costa slightly emarginate or straight except at apex and humeral angle; outer margin slightly sinuate, convex from apex to vein $Cu_2$. Secondaries rounded, lobed at anal angle. Both primaries and secondaries longer and more rounded in the female than in the male. Cell of primaries about three-fifths as long as wing; discocellulars weak, scarcely oblique; vein $M_2$ almost

straight, about two-thirds as far from $M_3$ as from $M_1$; $Cu_2$ much nearer to $Cu_1$ than to base of wing in both sexes. Male without stigma. Mid tibiae spined. Pl. XVII, fig. 8.

KEY TO THE SPECIES

1. Under surface of secondaries with a brown patch on a lighter ground....*arabus*
   Under surface of secondaries more uniformly colored.....2
2. Color light gray-brown; spots on primaries partly hyaline.....*eufala*
   Color dark fuscous-brown.....3
3. Wings almost immaculate above, rarely with a trace of small spots on primaries.....*l'herminieri*
   Primaries with three linear subapical spots and two on disk, all faint *neamathla*
   Primaries usually with three subapical and three discal spots, sometimes less, spots clearly defined.....*tripunctus*

1. **Lerodea l'herminieri** (Latreille). Pl. XXXII, fig. 32.
   *Hesperia l'herminier* Latreille, Enc. Meth. IX, 777, 1823. Carolina.
   *Pamphila herminieri* Kirby, Cat. Diurn. Lep. 597, 1871.
   *Hesperia fusca* Grote and Robinson, Trans. Am. Ent. Soc. I, 2, 1867. Atlantic District; Georgia, Florida.
   *Lerodea l'herminieri* Riley, Trans. Ent. Soc. London 240, 1926.

Southern United States, north into New York and Missouri; March to September.

This species is usually immaculate fuscous above and slightly tinged with yellow below, especially on the veins of the secondaries. Occasional specimens show a faint trace of spots on the upper surface of the primaries and the depth of the ground color varies. The species is, however, too close to *neamathla* to be separated conclusively without an examination of the male genitalia. In *l'herminieri* the valve has no terminal lobes.

The replacement of the familiar name *fusca* by *l'herminieri* is, at the best, a somewhat arbitrary disposition of a name which cannot be accurately placed. We have no decided opinion in the matter; perhaps it is just as well to place these names as Captain Riley has done in this case.

2. **Lerodea neamathla** Skinner and Williams. Pl. XXXII, fig. 33.
   *Lerodea neamathla* Skinner and Williams, Trans. Am. Ent. Soc. XLIX, 145, fig. 33 (♂ gen.), 1923. Central Florida.

Florida to Texas, March, May, and September; Missouri, June.

*Neamathla* is usually more distinctly spotted than *l'herminieri*, but is best distinguished by the form of the male genitalia. The valve bears two terminal lobes, one dorsal and toothed, the other rounded, smaller, and projecting ventrad.

3. **Lerodea arabus** (Edwards). Pl. XXXII, fig. 34.
   *Pamphila arabus* Edwards, Papilio II, 26, 1882. Southern Arizona.
   *Lerodea dysaules* Godman, Biol. Cent.-Am., Rhop. II, 500, pl. 95, fig. 19, 20, 1900. Guerrero, Mexico.

Arizona and Mexico, April.

*Arabus* is much like *eufala* above, but the brown shade on the under surface of the secondaries distinguishes it readily.

4. **Lerodea eufala** (Edwards). Pl. XXXII, fig. 35.

*Hesperia eufala* Edwards, Trans. Am. Ent. Soc. II, 311, 1869. Apalachicola, Florida.

*Pamphila floridae* Mabille, Bull. Soc. Ent. France (5), VI, p. ix, 1876. Florida.

*Carystus micylla* Burmeister, Desc. Phys. Rep. Arg. V, 272, 1878. Buenos Ayres.

*Cobalus dispersus* Gundlach, Contrib. Ent. Cubana I, 154, 1881. Cuba.

*Lerodea eufala* Holland, Butterfly Book 356, pl. XLVI, fig. 33, 1898.
Godman, Biol. Cent.-Am., Rhop. II, 500, pl. 95, fig. 16–18, 1900.
Draudt, Seitz's Macrolep. V, 941, pl. 182k, 1924.

*Lerodea eufala floridae* var. *obscura* Mabille, Gen. Ins. XVII, 131, 1904.

† *Pamphila nereus* Wright, (not Edwards), Butt. W. Coast 445, pl. XXXI, fig. 445, b, c, 1905.

*Carystus mycilla* Giacomelli, Ann. Soc. Cien. Arg. LXXII, 251, 1911.

Florida to Arizona and northward; California. Lindsey has taken it in late September at Sioux City, Iowa, the northernmost record known to us. In the south it flies from April to July and from late September to November.

5. **Lerodea tripunctus** (Herrich-Schaeffer). Pl. XXXII, fig. 36.

*Cobalus tripunctus* Herrich-Schaeffer, Corr.-Blatt Regensb. XIX, 53, 1865. Cuba.

*Pamphila ancus* Moschler, Verh. z-b. Ges. Wien XXVIII, 214, 1878. Colombia.

*Hesperia conta* Plötz, Stett. ent. Zeit. XLVII, 95, 1886. Minas Geraes.

*Megistias jamaca* Schaus, Proc. U. S. N. M. XXIV, 452, 1902. Jamaica.

*Megistias tripunctus* Draudt, Seitz's Macrolep. V, 974, pl. 187k, 1924.

We have seen two specimens labelled Florida and, while we cannot vouch for the accuracy of the record, it is not improbable that the species enters our country.

## GROUP D

### Key to the Genera

1. Middle tibiae without spines..... *Prenes*
   Middle tibiae spined.....2
2. Male with stigma; under surface of secondaries mottled with several colors..... *Thespieus*
   Male without stigma; under surface of secondaries with uniform ground color..... *Calpodes*

### Genus **Thespieus** Godman

Orthotype *Hesperia dalman* Latreille

*Thespieus* Godman, Biol. Cent.-Am., Rhop. II, 519, 1900.

This genus is very close to *Calpodes* in structure and the male genitalia are

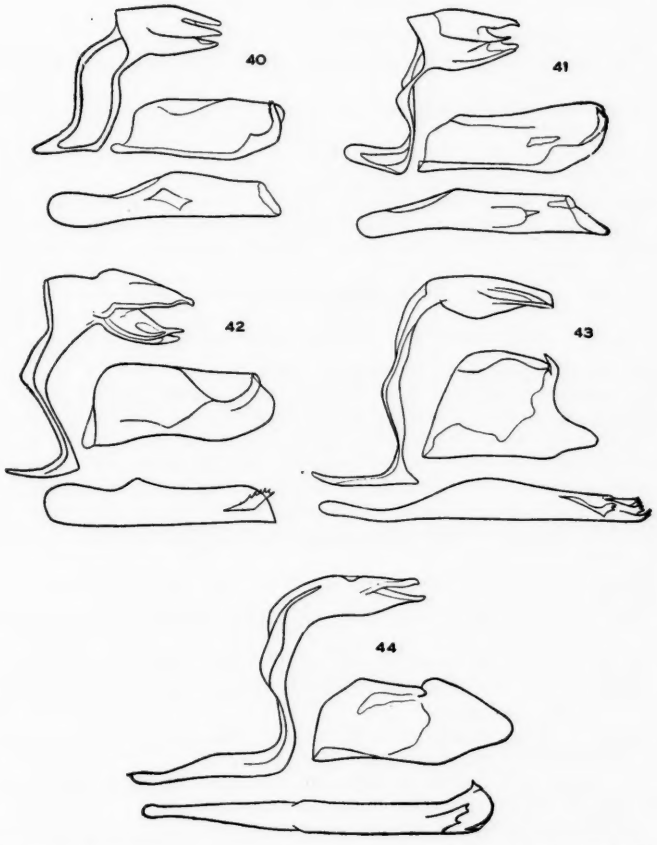





PLATE XXXIII. MALE GENITALIA

Fig. 40. *Prenes ocola*. Fig. 41. *P. sylvicola*. Fig. 42. *Calpodes ethlius*. Fig. 43. *P. nyctelius*. Fig. 44. *Thespieus macareus*.

similar, but the species are very different in superficial appearance. Both genera are better represented in the South and Central American fauna.

1. **Thespieus macareus** (Herrich-Schaeffer). Pl. XXXIII, fig. 44.
   *Goniloba macareus* Herrich-Schaeffer, Corr.-Blatt Regensb. XXXIII, 192, 1869.
   *Thespieus macareus* Godman, Biol. Cent.-Am., Rhop. II, 520, pl. 96, fig. 41–43, 1900.
   Skinner, Ent. News XIII, 183, 1902.
   Draudt, Seitz's Macrolep. V, 952, pl. 184f, 1924.

*Macareus* has been recorded from the southwestern part of our country and from Marco Id., Florida. It extends through Central and South America to Paraguay.

### Genus **Calpodes** Hübner

Logotype *Papilio ethlius* Cramer

*Calpodes* Hübner, Verz. bek. Schmett. 107, 1820.

Palpi upturned, closely appressed; third joint small, almost entirely concealed. The palpi resemble those of most species of Group A of the Pyrginae. Antennae less then one-half as long as primaries; club stout, apiculus exceeding thickness of club, sharply reflexed. Primaries with the apex produced and subtruncate, longer in the female than in the male; secondaries strongly lobed at the anal angle, broader and more rounded in the female than in the male. Neuration as in *Prenes*. Mid tibiae with short prostrate spines on the inner surface. Pl. XXV, fig. 1.

1. **Calpodes ethlius** (Cramer).
   *Papilio ethlius* Cramer, Pap. Exot. IV, 212, pl. CCCXCII, fig. A, B, 1782. Surinam.
   *Hesperia chemnis* Fabricius, Ent. Syst. III (I), 331, 1793. Pernambuco.
   *Eudamus olynthus* Boisduval and LeConte, Lep. Am. Sept. pl. 75, fig. 1, 2, 1822. Georgia.
   *Calpodes ethlius* Scudder, Butt. E. U. S. II, 1750, 1889.
   Holland, Butterfly Book 355, pl XLV, fig. 3, 1898.
   Godman, Biol. Cent.-Am., Rhop. II, 507, pl. 95, fig. 45, 46, 1900.
   Draudt, Seitz's Macrolep. V, 944, pl. 183c, 1924.
   Comstock, Butt. Cal. 227, pl. 62, fig. 20, 24, 1927.

Florida to Texas; March, June to December. The species ranges northward and has been taken at St. Louis, Missouri (Knetzger) and on Long Island (Engelhardt). It also extends into South America and the Antilles.

*Ethlius* is readily distinguished from the other North American skippers by its large size, the long cell of the primaries, the form of the palpi, and the presence of hyaline spots on the secondaries.

## Genus **Prenes** Scudder

Orthotype *Hesperia panoquin* Scudder

*Prenes* Scudder, Rept. Peabody Acad. 1871, 81 (60), 1872.

Similar to *Calpodes* but with the wings more angular and the mid tibiae without spines. Pl. XXV, fig. 1.

We still hesitate to commit ourselves to the union of this genus with *Parnara*, although we recognize their similarity.

### Key to the Species

1. Secondaries with a few pale spots below.....2
   Secondaries immaculate below or with pale dashes or very faint traces of spots.....4
2. Upper surface powdered with yellowish scales.....*panoquinoides*
   Upper surface without yellowish scales.....3
3. A pale spot in end of cell of primaries; spots on under surface bluish *sylvicola*
   No spot in cell; spots below not bluish.....*errans*
4. Two pale dashes on under surface of secondaries.....*panoquin*
   This surface immaculate or with diffuse shades; pale dashes never present....5
5. Primaries with spots in end of cell.....*nyctelius*
   Primaries without spots in end of cell.....*ocola*

1. **Prenes sylvicola** (Herrich-Schaeffer). Pl. XXXIII, fig. 41.

   *Goniloba sylvicola* Herrich-Schaeffer, Corr.-Blatt. Regensb. XIX, 55, 1865. Cuba.

   *Prenes nero* form *sylvicola* Draudt, Seitz's Macrolep. V, 948, pl. 183i, 1924.

   *Prenes nero* Auct., (Fabricius?)

   Florida and Texas, September.

   Differs from *ocola* in the presence of a pale spot in the end of the cell of the primaries and from *ocola* and *nyctelius* in the transverse row of faint bluish spots on the under surface of the secondaries.

2. **Prenes nyctelius** (Latreille). Pl. XXXIII, fig. 43.

   *Hesperia nyctelius* Latreille, Enc. Meth. IX, 746, 1823. Brazil and Surinam. Riley, Trans. Ent. Soc. London 234, 1926.

   *Hesperia ares* Felder, Verh. z.-b. Ges. Wien XII, 477, 1862. Rio Janeiro.

   *Hesperia aegialea* Plötz, Stett. ent. Zeit. XLIV, 51, 1883.

   *Prenes ares* Godman, Biol. Cent.-Am., Rhop. II, 510, pl. 96, fig. 10, 11, 12, 1900.

   Draudt, Seitz's Macrolep. V, 949, pl. 183k, 1924.

   Brownsville and San Antonio, Texas, May; Antilles.

   To the best of our knowledge, the above synonymy is correct for the species which has been treated as *Calpodes coscinia* in our fauna.

3. **Prenes panoquin** (Scudder). Pl. XXXII, fig. 39.

   *Hesperia panoquin* Scudder, Proc. Ess. Inst. III, 178, 1863. Connecticut.

   *Hesperia ophis* Edwards, Trans. Am. Ent. Soc. III, 216, 1871. Apalachicola, Florida.

*Prenes panoquin* Scudder, Butt. E. U. S. III, p. 1867, 1889.
Draudt, Seitz's Macrolep. V, 949, pl. 184a, 1924.
*Hesperia cochles* Scudder (Latreille ms.), Butt. E. U. S. III, p. 1867, 1889.
*Pamphila panoquin* Skinner, Ent. News XI, pl. II, fig. 13, 14, 1900.
*Hesperia wimico* Godman (Plötz ms.), Ann. Mag. Nat. Hist. (7), XX, 143, 1907. Florida.
Florida to Alabama and New Jersey; April to August, November.

4. **Prenes panoquinoides** (Skinner). Pl. XXXII, fig. 37.
*Pamphila panoquinoides* Skinner, Ent. News II, 175, 1891. Key West, Florida; Texas.
Id. op. cit. XI, pl. II, fig. 26, 1900. Type.
Florida and Texas, November; Cuba.
This species is slightly powdered with yellowish scales above but less heavily than *panoquin*, from which it differs also in the absence of the large dashes on the under surface.

5. **Prenes errans** (Skinner). Pl. XXXII, fig. 38.
*Pamphila errans* Skinner, Ent. News III, 174, 1892. California.
† *Pamphila nereus* Wright (not Edwards), Butt. W. Coast pl. XXXI, fig. 445, 1905.
*Prenes errans* Comstock, Butt. Cal. 227, pl. 62, fig. 18, 19, 21, 1927.
California, July to September.
The spots on the under surface of the secondaries are more numerous, more yellowish, and more elongate than those of *panoquinoides*.

6. **Prenes ocola** (Edwards). Pl. XXXIII, fig. 40.
*Hesperia ocola* Edwards, Proc. Ent. Soc. Phil. II, 20, pl. XI, fig. 4, 1863. Georgia, Florida, and Texas.
*Prenes hecebolus* Scudder, Rept. Peabody Acad. 1871, 81 (60), 1872. Tehuantepec.
*Pamphila ortygia* Möschler, Verh. z.-b. Ges. Wien XXXII, 328, 1882. Inner Surinam.
*Prenes ocola* Scudder, Butt. E. U. S. III, p. 1866, 1889.
Holland, Butterfly Book 355, pl. XLVI, fig. 34, 1898.
Godman, Biol. Cent.-Am., Rhop. II, 511, pl. 96, fig. 13–15, 1900.
† *Prenes cornelius* Draudt (not Latreille), Seitz's Macrolep. V, 949, pl. 184a, 1924.
Florida to Virginia and Kentucky, west to Arkansas and Texas; our records are scattered through most months from February to October. The species also occurs in the West Indies.
*Ocola* is usually immaculate below but some specimens show a trace of the spots which mark *errans* and *panoquinoides*. They are rarely conspicuous enough to cause difficulty in separating the species and never have the bluish shade of the spots of *sylvicola*.

## FAMILY MEGATHYMIDAE

Head small, much narrower than thorax. Palpi rather small, oblique. Antennae moderate, club large and stout, pyriform to more cylindrical and with a

rudimentary apiculus. Venation much as in the Hesperiinae; vein $M_2$ of the primaries varies in position in the sexes of several species. Larvae borers in the stems of plants, principally in Yucca. Pl. XVII, fig. 9.

Barnes and McDunnough's revision of this family (Contributions, Vol. I, No. 3, 1912) remains a very satisfactory monograph, although a few changes must be noted. The following key was originally worked out from the wealth of material in the Barnes collection; as noted in the first edition of this paper it should be an adequate means of separation for the material which most collectors secure, and those who find it inadequate will, no doubt, be sufficiently interested in the group to consult other references. Only one genus is represented in our fauna, but we have in our area all but three of the known species of the family.

### Genus **Megathymus** Scudder

Orthotype *Eudamus yuccae* Boisduval and LeConte

*Megathymus* Scudder, Rept. Peabody Acad. 1871, 83 (62), 1872.
Characters of the family.

#### Key to the Species

1. Under surface with a large white patch contiguous to vein SC of the secondaries, or this spot the largest on the wing; no more than a trace of extramedian pale spots on secondaries.....*yuccae* 2
   Under surface of secondaries with a more or less complete transverse row of pale spots and with the larger spot on vein SC outward.....3
2. Size large, 55 to 75 mm. Spots of upper surface bright yellow. Under surface of secondaries gray at the margins.....*yuccae*
   Size smaller, seldom over 55 mm. Spots pale yellow. Outer margin of secondaries narrowly or not at all pale.....race *coloradensis*
   Size similar to *coloradensis*. Spots yellowish to white. Secondaries with a broad pale outer border.....race *navajo*
3. Size very large, 65 to 90 mm. Spots bright yellow. Secondaries without discal spots above and with at the most a slender linear pale margin.....*ursus*
   Size smaller, not over 70 mm. Secondaries with discal spots and a crenulate marginal band or with pale areas not bright yellow.....4
4. Under surface of secondaries smooth, powdered with blue-gray scales at outer margin.....*cofaqui*
   Under surface of shaggy appearance, washed with gray scales and hairs over entire surface, sometimes most evidently between transverse row of spots and outer margin.....5
5. Upper surface of primaries with a pale basal area contiguous to vein A. Spots yellow to yellowish fulvous, or with a transverse subbasal row of spots on the under surface of the secondaries.....6
   This area seldom present, if so, powdery and not contiguous to the anal vein and maculation not bright yellow. No transverse row of spots near base of secondaries below.....7
6. Expanse 40 to 50 mm. Larger specimens females with pale spots of primaries broadly confluent and veins concolorous.....*polingi*

Expanse 50 to 70 mm. Smaller specimens males with spots separated by dark veins or by broader dark areas.....*neumoegeni*
Expanse 50 mm. or slightly over. Spots small, rounded, and whitish. Southern California.....race *stephensi*

7. Spots yellowish white to pale yellow; at least one extradiscal spot on the under surface of the secondaries and rarely some above.....*streckeri*
Spots deeper yellow; extradiscal spots obsolete, not more than one or two fine points present, or with discal spots on upper surface.....race *texana*
Spots greatly reduced, yellowish; extradiscal band on under surface of secondaries evenly curved but irregular; spot in end of cell of primaries linear, bent, in apical angle of cell.....*smithi*

1. **Megathymus yuccae** (Boisduval and LeConte).
*Eudamus? yuccae* Boisduval and LeConte, Lep. Am. Sept. pl. 70, 1833.
*Megathymus yuccae* Riley, 8th Rept. St. Ent. Mo. 169, 1876.
Barnes and McDunnough, Contributions I (3), 28, and plates, 1912.
Skinner, Trans. Am. Ent. Soc. XXXVII, 202, 1911.
Draudt, Seitz's Macrolep. V, 998, pl. 193c, d, 1924.
Florida, Georgia, and South Carolina; March to May.
Draudt's figures are poor; they may represent *streckeri*.

1a. race **coloradensis** Riley.
*Megathymus yuccae* var. *coloradensis* Riley, Trans. Acad. Sci. St. Louis III, 567, 1877. Colorado.
Skinner, Trans. Am. Ent. Soc. XXXVII, 209, pl. X, 1911.
*Megathymus yuccae coloradensis* Barnes and McDunnough, op. cit. p. 33, pl. I, fig. 8, 9, 1912. (In part.)
Colorado, April to June.

1b. race **navajo** Skinner.
*Megathymus yuccae* var. *navajo* Skinner, Ent. News XXII, 300, 1911. Ft. Wingate, New Mexico.
*Megathymus yuccae navajo* Comstock, Butt. Cal. 229, pl. 62, fig. 25, 1927.
Texas to Arizona and southern California; April to June.

2. **Megathymus ursus** Poling.
*Megathymus ursus* Poling, Ent. News XIII, 97, pl. IV, 1902. Pima Co., Arizona.
Barnes and McDunnough, op. cit. p. 36.
We can add nothing to the information gained from a study of the type and two other specimens in the Barnes collection. The specimens were taken in August. They seem to be distinct from *streckeri*, although their resemblance to that species has been noted.

3. **Megathymus cofaqui** (Strecker).
*Aegiale cofaqui* Strecker, Proc. Acad. Nat. Sci, Phil. 148, 1876. Georgia.
*Megathymus cofaqui* Skinner, Trans. Am. Ent. Soc. XXXVII, 203, 1911.
Barnes and McDunnough, op. cit. p. 34, fig., 1912.
Skinner and Williams, Trans. Am. Ent. Soc. L, 207, fig. 26 (male gen.), 1924.
Georgia and Florida, March and April.

The male type is a form of *streckeri* to which Barnes and McDunnough gave the name *texana*. The female type represents *cofaqui*. This sex may easily be distinguished by the slightly emarginate outer margin of the primaries and the resultant sharpness of the apex.

4. **Megathymus streckeri** (Skinner).

*Aegiale streckeri* Skinner, Can. Ent. XXVII, 179, 1895. Arizona?

*Megathymus streckeri* Id., Trans. Am. Ent. Soc. XXXVII, 204, 1911. Barnes and McDunnough op. cit p. 36, plates, 1912.

† *Megathymus cofaqui* Draudt, (not Strecker), Seitz's Macrolep. V, 998, pl. 193b, 1924.

Arizona? New Mexico, Colorado; Cherry County, Nebraska, (Leussler); May and June.

The Draudt figure probably represents this species; it is certainly not *cofaqui*.

4a. race **texana** Barnes and McDunnough.

*Megathymus streckeri* subsp. *texana* Barnes and McDunnough, Contributions I (3), p. 39, pl. II, fig. 9, 1912.

Southern Texas.

This race differs from typical *streckeri* in the smaller size, deeper yellow spots, reduction of the spots on the under surface of the secondaries and lack of the brown patches which sometimes replace them in *streckeri*. The range of size given by Barnes and McDunnough is: male 55–62 mm; female 50 mm.

5. **Megathymus smithi** Druce.

*Megathymus smithi* Druce, Biol. Cent.-Am., Het. II, 320, pl. 69, fig. 5, 1896. Skinner, Trans. Am. Ent. Soc. XXXVII, 205, 1911. Barnes and McDunnough, op. cit. p. 41, 1912.

There is one specimen from Corpus Christi, Texas, in the Barnes collection.

6. **Megathymus neumoegeni** Edwards.

*Megathymus neumoegeni* Edwards, Papilio II, 27, 1882. Southern Arizona. Barnes and McDunnough, op. cit. p. 21, plates, 1912. Draudt, Seitz's Macrolep. V, 998, pl. 193b, 1924. Skinner, Trans. Am. Ent. Soc. XXXVII, 206, 1911.

*Megathymus aryxna* Dyar, Jn. N. Y. Ent. Soc. XIII, 141, 1905. Arizona. Barnes and McDunnough, op. cit. p. 26, plates, 1912.

Arizona, September to November.

Barnes and McDunnough treated *neumoegeni* and *aryxna* as distinct, though closely related, species. Their course was followed in the first edition of this work, but the studies later made by Skinner and Williams fail to validate their distinctions. Anyone who is interested in the problem should consult McDunnough's excellent discussion in the *Contributions*.

6a. race **stephensi** Skinner.

† *Megathymus neumoegeni* Wright (not Edwards), Butt. W. Coast 255, pl. XXXII, fig. 483, 1905.

*Megathymus neumoegeni* subsp. *stephensi* Skinner, Ent. News XXIII, 126, 1912. La Puerta, San Diego Co., California. Barnes and McDunnough, op. cit. I, No. 5, p. 44, 1912.

*Megathymus stephensi* Skinner, Ent. News XXVIII, 232, 1917.
Barnes and Benjamin, Ent. News XXXIV, 218, 1923.
Comstock, Butt. Cal. 228, pl. 62, fig. 23, 1927.
Southern California and Texas.

7. **Megathymus polingi** Skinner.
*Megathymus polingi* Skinner, Ent. News XVI, 232, 1905. Arizona.
Id., Trans. Am. Ent. Soc. XXXVII, 207, 1911.
Barnes and McDunnough, op. cit. I, No. 3, p. 27, plates, 1912.
Arizona, September.
According to Barnes and McDunnough only the female type is *polingi*.

7a. form **mariae** Barnes and Benjamin.
*Megathymus mariae* Barnes and Benjamin, Contributions V, no. 3, 100, 1924.
El Paso, Texas.
Skinner and Williams, Trans. Am. Ent. Soc. L, 206, 1924.
Texas, October and November.
We concur with the opinion expressed by Skinner and Williams, that *mariae* is not more than a form of *polingi*, although we lack absolute proof. It was described as intermediate between *polingi* and *neumoegeni* and was based on characters of the maculation of the primaries. The spot between A and $Cu_2$ of the primaries is said to be the widest in the band, while in *polingi* it is narrower than the two in front of it. In the female the spot in the end of the cell is said to be separate from the discal band.

8. **Megathymus albocincta** Holland.
*Megathymus albocincta* Holland, Ann. Carnegie Mus. XIX, 159, 1930.
We are not acquainted with this recently described species. According to Dr. Holland's description the male and female types, without locality labels, have stood in his collection for years bearing W. H. Edward's tentative identification as *cofaqui*. The species is said to be nearer *yuccae*; figures are promised in the forthcoming new edition of *The Butterfly Book*.

V

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